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EDITORS:

REV. GEO. D. HULST, JOHN B. SMITH.

ASS'T EDITORS:

CHRIS. H. ROBERTS. [Nos. 1—4.]
FRANK H. CHITTENDEN. [Nos. 5—12.]

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EDITOR:
REV. GEO. D. HULST,
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ASST. EDITOR:
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	CHRIS. H. ROBERTS.	
	G. W. J. ANGELL.	
	WM. BEUTENMUELLER.	
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ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, JANUARY, 1889. NO. 1.

A GENERIC SYNOPSIS OF THE FULGORIDÆ.

By Wm. H. Ashmead.

[Continued from page 141, Vol. IV.]

Family II. FULGORIDÆ.

Head of various forms, often with a cephalic prolongation and sometimes luminous. The frons nearly always keeled. Ocelli 2, rarely 3 or wanting, placed beneath the eyes or sunken in the cheeks close to the eye, the third ocellus, when present, placed in the middle of the frons. Antennæ always beneath the eye, usually large, distinct, the joints of which are frequently long and dilated; sometimes with an appendage. Thorax weak, usually keeled; scutellum small. Wings usually long and strongly veined, often short but rarely entirely wanting. Tegulæ most frequently present. Anterior coxæ generally elongated; posterior coxæ transverse, contiguous, extending from the sides of the body. Tibiæ prismatic or foliaceous. Tarsi 3-jointed, generally spined.

This is one of the most extensive of the homopterous families, well represented in North America, and comprises some of the most curious and interesting forms to be found among insects.

The family may be divided into ten subfamilies, recognizable by the aid of the following table:

TABLE OF SUBFAMILIES.

Wings when at rest not lying perpendicular in repose. ....2.
Wings when at rest lying perpendicular in repose.
  External border of elytra without transverse, parallel nervures ....
    Subfamily I. **ACANONIINÆ.**
  External border of elytra with transverse, parallel nervures.
    Vertex not separated from the frons by a transverse keel, or greatly prolonged into a point beyond the eyes; clavus at apex usually obtuse and usually confounded with the corium............ Subfamily II. **FLATINÆ.**
    Vertex very short, front part narrow or generally rounded before the eyes, separated from the frons by a transverse keel; clavus at apex acute, distinct ....Subfamily III. **RICANIINÆ.**

2 Frons separated from the cheeks by a sharp margin.
Clypeus with marginal keels. .... 3.
Clypeus without marginal keels, or when keeled anterior legs dilated.
Legs simple .... SUBFAMILY IV. **ISSINÆ.**
Legs dilated or foliaceous .... SUBFAMILY V. **CALOSCELINÆ.**
3 Head not prolonged beyond the eyes into a distinct cephalic prolongation ; or, if prolonged then the anal area not reticulated.............................. 4.
Head prolonged beyond the eyes into a more or less distinct cephalic prolongation; or, if not prolonged then the anal area is reticulated.
Prothorax notably shorter and narrower than the mesothorax ; elytra usually transparent and much longer than the abdomen, seldom coriaceous or shortened .... SUBFAMILY VI. **DICTIOPHARINÆ.**
Prothorax and mesothorax forming a rhomb nearly as long as broad ; elytra usually horny........................ SUBFAMILY VII. **FULGORINÆ.**
4 First joint of the hind tarsi without a large movable spur at base .... SUBFAMILY VIII. **CIXIINÆ.**
First joint of the hind tarsi with a large movable spur at the base .... SUBFAMILY IX. **DELPHACINÆ.**
Frons not separated from the cheeks by a sharp margin .... SUBFAMILY X. **TETTIGOMETRINÆ.**

SUBFAMILY I. ACANONIINÆ.

TABLE OF GENERA.

Vertex long, thorax not covered .... 2.
Vertex short, thorax covered. .... G. 1. **Acanonia,** A. et S.
2 Head conical, vertex oblong ; wings semicircular, large..... G. 2. **Thiscia,** Stål.
Head angularly produced,
Vertex slightly transverse ; wings outwardly rounded, vertex roundedly truncated .... G. 3. **Philatis,** Stål.
Vertex very slightly concave ; wings toward the middle gradually rounded, from thence somewhat narrow, apex truncate......... G. 4. **Chlorochara,** Stål.

SUBFAMILY II. FLATINÆ.

TABLE OF GENERA.

Basal joint of the antennæ very small, not easily distinguishable..................... 2.
Basal joint of the antennæ elongated.
Basal joint shorter or as long as the second joint.
Second joint much longer than the basal .... G. 1. **Phromnia,** Stål.
Second joint as long as the basal .... G. 2. **Cerynia,** Stål.
Basal joint longer than the second .... G. 3. **Cenestra,** Stål.
2 Second antennal joint very long, at least as long as the breadth of the frons....... G. 4. **Delapax,** Spinola.
Second antennal joint twice as long as broad ; frons without a median keel ; clypeus convex, with a feeble, sharp, median keel towards apex .... G. 5. **Meenoplus,** Fieber.
Second antennal joint short or somewhat short.
Posterior tibiæ unarmed, without spines .... 6.
Posterior tibiæ armed, with one spine .... 5.
Posterior tibiæ armed, with two spines.

Vertex produced with an acute margin, flat or slightly convex............4.

Vertex not produced, short, thrice keeled.

Thorax elevated on the disk, compressed with an acute keel on each side..3.

Thorax transversely convex.

Ocelli distinct.

Wings with two series of transverse moderately regular veins, the longitudinal vein behind and between these series, simple, not forked...................... .....G. 6. **Dascalia**, Stål.

Wings between the clavus at apex and the intercostal longitudinal vein with a regular series of distinct transverse veins, before this series nowhere wanting in irregularly disposed veins, but between the second series, veins regularly transverse ; head truncate ..... G. 7. **Ormenis**, Stål.

Wings without series, or then with irregular transverse veins, series in that case not reaching the intercostal vein....G. 8. **Flata**, Fabr.

Ocelli wanting ; transverse veins of wings irregularly arranged .... .. G. 9. **Pœciloptera**, Latreille.

3 Veins of wings irregularly transversely arranged ... .G. 10. **Sarpanta**, Stål.

4 Head triangularly produced ; frons flat, convex at base ; wings with irregular transverse veins ; marginal suture straight, the angle of the suture very longly produced..................................G. 11. **Carthaca**, Stål.

Corium hardly longer than the clavus.

Head transversely quadrately produced, anteriorly somewhat roundedly truncated ; frons somewhat concave..............G. 12. **Phlebopterum**, Stål.

Head truncate ; wings reaching somewhat beyond the apex of abdomen........ G. 13. **Bryllis**, Stål.

Corium nearly twice the length of the clavus.

Wings elongated, narrowed, very gradually narrowed toward the apex .... G. 14. **Cyarda**, Walker.

5 Antennæ somewhat elongated, reaching anteriorly beyond the margins of the cheeks ; ocelli subobsolete or wanting.............G. 15. **Copsyrna**, Stål.

Antennæ short, distinct.

Transverse veins of wings irregularly arranged.

Vertex flat, produced, but the disk of thorax and scutellum not lying in the same plane ....G. 16. **Siphanta**, Stål.

Vertex not prominent, but the frons at base prominently gibbous ; thorax and scutellum convex ....G. 17. **Gyaria**, Stål.

Transverse veins in a regular contiguous series toward apex of wings, between the apex of the clavus and the intercostal veins.....G. 18. **Petrusa**, Stål.

Clavus without a distinct transverse vein.

Wings with an oblique transverse vein before the middle, between the interior ulnar veins and the ramus of the exterior ulnar veins .... G. 19. **Atella**, Stål.

6 Frons and clypeus without a median keel.............................. ....8.

Frons and clypeus with a median keel.

Clypeus and frons with a suture between ....7.

Clypeus and frons without a suture between.

Vertex triangular with a median keel ; mesonotum lozengoidal with a median keel and straight diverging lateral keels ; rostrum prolonged nearly between the middle coxæ........... ....G. 20. **Hemitropis**, Fieber.

Vertex short, concave ; frons but slightly prominent ; wings from within behind the apex of clavus not enlarged ; clavus from the exterior vein obsoletely granulated ....G. 21. **Lamenia**, Stäl.

7 Face straight; side keels of pronotum curving around the eyes. Basal antennal joint very small, annular ; second joint short, cylindrical. Elytra much longer and much narrower than the abdomen, and narrowly rounded at apex. ..... G. 22. **Haplacha.** Fieber.

Vertex narrow, quadrangularly elongated ; eyes reniform ; rostrum prolonged between the posterior coxæ ....G. 23. **Myndus**, Stäl.

Vertex nearly an isosceles triangle ; frons trapezoidal : eyes oval .... G. 24. **Trigonocranus**, Fieber.

8 Vertex very short, gradually rounded off into the frons ; clavus long, acute, reaching nearly to apex of wings with one longitudinal vein and transverse veins ; wings large, roundedly truncate behind.....G. 25. **Amphiscepa**, Germar.

SUBFAMILY III. RICANIINÆ.

TABLE OF GENERA.

Frons with one or three keels or keels wanting ....2.

Frons with two distinct keels, slightly converging toward apex, much longer than broad ; vertex before the eyes distinctly prominent ; lateral margins of clypeus only keeled at base. Wings as broad as long, broadly rounded at apex, with a contiguous series of transverse veins between the apex of clavus and the transverse vein of costal area, the costal area of normal breadth ; the interior vein of the corium forked before the middle.

Wings vitreous ; posterior tibiæ with three spines.........G. 1. **Miriza**, Stäl.

Wings opaque ; posterior tibiæ with four spines.........G. 2. **Mindura**, Stäl.

2 Lateral margins of clypeus keeled ....5.

Lateral margins of clypeus not keeled.

Wings much enlarged toward apex...4.

Wings not much enlarged toward apex.

Wings as broad as long, with a regular series of transverse veins towards apex; posterior tibiæ with two spines behind the middle...G. 3. **Pricesa**, Stäl.

Wings toward apex very gradually enlarged ; posterior tibiæ with three spines behind the middle................ ....G. 4. **Ricania**, Germar.

3 Marginal area with very narrow transverse veins ....4.

Marginal area with normal transverse veins.

Longitudinal veins of wings much forked, with two regular series of transverse veins toward apex, joining the apical..........G. 5. **Porchazia**, A. et S.

Longitudinal veins of wings rarely forked, with two series of irregular transverse veins, remote.... .... G. 6. **Tarundia**, Stäl.

4 Longitudinal veins rarely emitting a forked vein from base of areole, the first forked before the base ; transverse veins very rare ....G. 7. **Armacia**, Stäl.

5 Wings nearly two and a half times longer than broad, apex subtruncate ; marginal area with narrow transverse veins ; frons as broad as long........ .... G. 8. **Bladina**, Stäl.

Wings circular, half as long as broad, apex broadly rounded ; marginal area with broad transverse veins.

Wings vitreous, transverse veins remote.... ....G. 9. **Nagodina**, Stäl.

Wings opaque, transverse veins very numerous ....G. 10. **Vutina**, Stäl.

SUBFAMILY IV. ISSINÆ.

TABLE OF GENERA.

Wings much shortened, not reaching the tip of abdomen, or rudimentary; the head produced.. 4.

Wings not unusually shortened, complete.

Head produced.. 3.

Head truncated, before the eyes not or scarcely prominent; wings strongly decumbent.

Posterior tibiæ with three spines.. 2.

Posterior tibiæ with two spines.

Costa before the middle or anteriorly beneath, very distinctly dilated; interior ulnar vein simple, exterior ulnar vein and the radial vein near the base, forked; vertex smooth.... G. 1. **Hysteropterum**, A. et S.

Costa simple beneath towards the base, excepting a very obsolete dilation; wings behind the apex of the clavus oblique, very obtusely rounded, the interior ulnar vein nearly simple; first joint of posterior tarsi short.... G. 2. **Falcidius**, Stål.

Thorax at base slightly and broadly sinuated.

Wings vitreous, regularly reticulated, obtusely rounded at apex; costa dilated, membrane of costa with transverse veins, ulnar vein in the middle of wing, forked .... G. 3. **Neæthus**, Stål.

Wings at apex very slightly deeply angulately emarginated or incised, and rarely with transverse veins, not reticulated; the vein of the anal area forked; anterior femora simple, subcompressed................ G. 4. **Thionia**, Stål.

Wings at apex entire; frons and clypeus lying nearly in the same plane, the frons somewhat reclining and slightly reflexed G. 5. **Issus**, Fabr.

2 Vertex very short, sublunate, anterior margin strongly carinated; frons rounded, prominent, the central plate almost circular, flattened and very much raised above the surrounding area, exterior margins strongly carinate, curving conformable with the central plate. Pronotum longer than the vertex, lunate, bluntly curved on anterior margin, posterior margin deeply sinuated. Hemelytra long and narrow, a little obliquely rounded at tip, costal and sutural margins nearly straight................ G. 6. **Aphelonema**, Uhler.

Vertex subquadrate, deeply scooped out, anterior angles rectangular with bounding keels high, anterior margin arched in the centre; frons longer than wide, sides convexly curved, middle keel extends $2^{1}/_{8}$ its length downwards. Pronotum acutely triangular, extending forward almost to front line of eyes, deeply emarginated behind. Hemelytra long and narrow, vitreous, hispid, regularly parabolic on the costal margin, from the base to the inner apical angle, the inner margin straight; field with a net-work of large rounded areoles; costal area obliterated .... G. 7. **Dictyonissus**, Uhler.

Abdomen distinctly compressed; costa remote from the margin; anterior tibiæ longer than the femora and trochanters together.... G. 8. **Tylana**, Stål.

3 Costa occupying the same margin, beneath anteriorly or before the middle, dilated; posterior tibiæ with one spine .... G. 9. **Mycterodus**, Spinola.

4 Wings tailed, apical angle of the commissural produced, slightly curving upwards; clavus not attaining the apex of the wing. Costa dilated, remote from the margin, dilated part with transverse veins, not inflexed; posterior tibiæ with two spines .... G. 10. **Conosimus**, Mulsant.

Vertex before the eyes, produced.
  Wings very much shortened, truncated ; frontal disk largely elevated ; thorax anteriorly produced beyond the middle of the eyes.............. .... G. 11. **Peltonotus**, Mulsant.
  Wings oblong, apex extending somewhat beyond the abdomen ; frontal disk not or very slightly elevated ; thorax produced to the middle of the eyes ...... G. 12. **Ommatiotus**, Spinola.
Vertex before the eyes, not prominent ; body cylindrical ; wings much shorter than abdomen.
  Frons and vertex forming an obtuse angle, very gradually produced towards apex ; clypeus large, towards the horizontal portion largely inflexed. ... G. 13. **Bruchomorpha**, Newman.
  Frons prolonged, globularly enlarged at apex.......... G. 14. **Naso**, Fitch.

SUBFAMILY V. CALOSCELINÆ.

TABLE OF GENERA.

Posterior tibiæ with more than three spines, multispinous......................2.
Posterior tibiæ with not more than three spines.
  Anterior legs strongly dilated, foliaceous.
    Posterior tibiæ with one spine ....G. 1. **Caloscelis**, Laporte.
    Posterior tibiæ with three spines.
      Lateral margins of vertex dilated, elevated........................ G. 2. **Elasmoscelis**, Spinola.
      Lateral margins of vertex not dilated, not elevated .... G. 3. **Lacusa**, Stål.
  Anterior femora and tibiæ somewhat dilated.
    Head before the eyes prominent ; frons elevated, compressed ; posterior tibiæ with two spines..........................G. 4. **Lophops**, Spinola.
2 Clypeus much longer than its breadth at base ; legs long or somewhat lengthened.
  Head with a very distinct callosity behind the eyes ; anterior femora and tibiæ slightly compressed, dilated......... ... .G. 5. **Almana**, Stål.
  Head without or scarcely with a callosity behind the eyes ; anterior femora alone compressed, body broadly oval ; head somewhat triangularly produced.... G. 6. **Orgerius**, Stål.
Clypeus a little longer than its breadth at base, legs short, anterior legs compressed ....G. 7. **Risius**, Stål.

[TO BE CONTINUED.]

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Change of Name.

In Proc. Cal. Acad., 2nd Series, Vol. 1, issued June 5th, 1888, I described a new genus and species of N. A. Scarabæidæ under the name of *Anoplognatho Dunnianus* but now finding this to be already in use I desire to substitute that of *Aphonides Dunniana*. J. J. RIVERS.
University of California, Oct. 23, 1888.

A New Species of Euphanessa.

By Annie Trumbull Slosson.

Euphanessa meridiana, n. sp.

I have been familiar for two or three years, in South Florida, with the insect to which I give the above name. I thought, at first, that it might be merely a southern variety of *E. mendica*, Walk., but am now confident, after careful study and comparison, that it is a different species. It is uniformly smaller than *mendica*, none of my specimens exceeding .9 inch in expanse. The anterior wings are longer and narrower proportionately than in *mendica*, outer margin more oblique, and they are of a deeper ochreous tint, sometimes almost orange. The two rows of dusky, semi-transparent spots are quite different in appearance and arrangement. The outer row is composed of very small separate spots, which never coalesce; it is a mere dotted line, very regular in its course, with none of the blotchy unevenness of the same line in *mendica*. The inner row has only three spots, a large one in discal cell, and two much smaller, which are nearer the base and inner margin. Secondaries concolorous and immaculate. My description is comparative, rather than scientific, but will, I think, serve to identify the insect for all who know our common northern species. I have found this moth at Charlotte Harbor, Tampa, and Winter Park, but no farther north. I know nothing as yet of the larva.

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Note on Zeuzera pyrina.

By A. R. Grote.

In reference to Mr. Graef's interesting article (Ento. Americana, Vol. IV, p. 162) I would state that I did not include *Zeuzera æsculi (pyrina)* in my list, because I believed its occurence to be quite accidental. I believe *æsculi* and *pyrina* to be synonyms for the European species. With regard to *canadensis*, I do not think, from Herrich-Schäffer's figure, that it is a *Zeuzera*; certainly it is not *æsculi*. I have never seen the species. It is not yet certain that *æsculi* breeds in North America. The specimens observed may have been imported, as larvæ or pupæ, in wood. If it were indigenous to North America it would surely have been taken before this; the fact, that in Morris' Synopsis, *pyrina* is credited to North America, is probably due to an original mistake in the habitat. I have alluded elsewhere to the chance finding of a specimen of *æsculi* in Hoboken and I thought at the time, that it must have been imported, either purposely or accidentally. The question is now, whether *æsculi* breeds with us, as for instance the Asiatic *Philosamia cynthia* does. Whichever way this question is answered I am disposed to believe that its occurrence in North America originally will be found to be due to a comparatively recent importation.

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EDITOR OF ENTOMOLOGICA AMERICANA.

DEAR SIR:—After a knowledge of Mr. Grote's criticisms of my location of my genus *Cerathosia*, in ENTO. AM., and afterwards in the CAN. ENTO., I sent a specimen of the species to Mr. H. B. Moeschler, the well-known European Lepidopterist, requesting him to give me, for publication, his opinion of the family location of the genus. Mr. Moeschler writes me under date Sept. 28th,—"To-day I received the parcel containing the two moths. I have examined them and, there is no doubt, you are right; this species belongs to the *Arctiidæ*, as the costal nervule is not derived from the base of the hind wings, but from the discoidal cell; this characteristic separating the *Arctiidæ* and *Lithosiidæ* from the *Noctuidæ*, which have this nervule derived from the base of the wing, only a little connected with the fore edge of the cell. I do not doubt this species is an *Arctiid* nearly allied to *Deiopeia* and *Emydia*."

Under date Sept. 30th, Mr. Moeschler again wrote me:—"I received ENTO. AMERICANA, No. 6, to-day, and it was with great interest I read yours and Mr. Grote's paper on *Cerathosia tricolor*, Sm. If Mr. Grote had looked into 'Lederer's Noctuinen Europa's,' he could read, page 2, 'sie (die *Noctuinen*) unterscheiden sich von den *Lithosiden*,(incl. *Nola*, *Sarrothripa* und *Nycteoli*,) und *Arctiiden* durch die bei diesen aus der Mitte oder $^2/_3$ des Vorderrandes der Mittelzelle entspringenden Rippe 8 der Hinterflügel.' Mr. Grote would have spared much effort to prove something not existing, by reasons which are not of any value, if he had remembered the only important characteristic separating the *Lithosiidæ* and *Arctiidæ* from the *Noctuidæ*. I am much surprised that so distinguished a writer as Mr. Grote, could omit so important a characteristic, but—the systematic position of the genera of the so-called *Zygænidæ* in his New Check List, is sufficient to prove, that Mr. Grote's systematic views are sometimes more than singular!"—Seeing the specimens of *C. tricolor*, my first thought was, that it is a genus very closely allied to *Deiopeia (Utetheisa)* and *Emydia*, and I should have been much surprised if an exact examination had given another result."

So far as I am concerned, this closes the matter, except for the paper now in the hands of the printer, for the Proc. U. S. National Museum.

Washington, D. C., Oct. 18, 1888. JOHN B. SMITH.

ON NORTH AMERICAN TINEIDÆ.

By Wm. Beutenmüller.

Tinea seminolella, n. sp.

Head, thorax and palpi, deep fuscous. Primaries, fuscous, covered with deep fuscous scales, without any markings, except an indistinct blackish discal spot with a paler margin. Legs, body, secondaries and wings beneath, fuscous.

Expanse, 17 mm.

1 ♀. Coll. W. B. Hab.—Central Florida.

Acrolophus plumifrontellus, Clem.

The undescribed ♀ of this species differs from the ♂ only in having long porrected labial palpi, and the markings of the primaries much suffused with the ground color. Expanse, 19 mm. Length of palpi, 5 mm.

1 example. Coll. W. B Taken at Parkville, L. I., N. Y., July, 1888. Another specimen, much larger than the one I possess, is in the collection of Mrs. A. T. Slosson, taken in the White Mountains, N. H.

Psecadia albicostella, n. sp.

Head white, with a black spot on the vertex; palpi black, second and third joints tipped with white, thorax ochreous fuscous with two black spots, one on each side about the middle; tegulæ tipped with white. Body ochreous, tuft orange yellow. Primaries ochreous fuscous with a median, scaly, white basal streak, running to the apical third. Beyond this streak is a small black spot and one at the basal third of the wing below the fold. Extreme costa and cilia white. Before the apex on the costa are four small black spots and seven on the margin. Secondaries and underside of wings, ochreous fuscous. Expanse, 22 mm.

1 ♂. Coll. W. B. Hab.—Colorado.

Psecadia walsinghamella, n. sp.

Head white; palpi white; first and second joint with a black ring at the base; third with a black ring before the tip. Antennæ fuscous. Thorax white with four black spots. Body and legs ochreous. Primaries pure white, shining, with a number of black spots and four long black streaks; one at the base below the costa; one a little below and beyond; one in the cell; and one above and beyond nearly reaching the outer margin about the middle; at the end of the discal cell a small black spot and one below and beyond; below the fold are three spots; one about the basal fourth; one before the middle and one below and between the two; on the fold at the base of the wing a small spot. Above the long streaks through the middle of the wing beyond the basal one are a number of black subcostal spots, and on the costa before the apex a series of small spots running along the margin to the inner angle. Cilia white. Primaries beneath, fuscous, shining. Expanse, 21 mm.

1 ♂. Coll. W. B. Hab.—West Virginia.

Named in honor of Lord Walsingham, who has contributed much to the knowledge of American *Tineidæ*.

Psecadia semilugens, Zell., *var.* **plumbeella**, n. var.

This form can be distinguished from the type by the lead colored secondaries and dorsal half of the primaries. Expanse, 20 mm.

1 ♂. Coll. W. B. Hab.—Texas.

Depressaria curvilineella, n. sp.

Head white, thorax and legs grayish ochreous. Primaries gray, thickly clouded with grayish ochreous scales, especially at the base beyond the pale basal field which extends to the costal third; on the disk before the middle of the wing is a curved black streak and a little beyond a small white spot edged with black; costa sprinkled with fuscous scales. Cilia grayish ochreous. Secondaries gray fuscous; cilia white. Underside of primaries fuscous; costa and cilia white. Secondaries paler than above with four apical black spots. Expanse, 18 mm.

1 example Coll. W. B. Hab.—New York.

Gracilaria fuscoochrella, n. sp.

Head and palpi ochreous; legs ochreous annulated with fuscous; thorax and antennæ fuscous. Primaries and secondaries fuscous, as also the underside of all the wings. Expanse, 14 mm.

1 example. Coll. W. B. Hab.—California.

Cosmopteryx floridanella, n. sp.

Head olive brown with three fine white stripes; one on the middle and one on each side behind the eyes. These stripes are continuous with the three on the thorax which is also olive brown. Face silvery ochreous, as are also the palpi, underside of thorax and body; legs annulated with brown. Body above olive brown, in some lights yellowish ochreous. Primaries olive brown with three silvery white basal streaks; one on the subcosta, one on the dorsal margin and one above the fold; all running to about the basal third. Between the two latter streaks is another, beginning about the basal fourth and reaching the broad, pale yellow transverse patch beyond the middle of the wing; at the internal portion of the band below the costa is a small black margined metallic silvery spot and a larger one below and beyond; the external margin of the band is limited by a narrow transverse metallic silvery band, about the middle of which commences a narrow white streak running to the extreme apex of the wing. Secondaries grayish. Cilia olivaceous, as is also the underside of the wings. Expanse, 9 mm.

1 ♀. Coll. W. B. Hab.—Central Florida, May, 1887.

Cosmopteryx minutella, n. sp.

Head deep brown with three fine white stripes; (scales abraded on the thorax); palpi white with a few brown scales; legs ochreous annulated with brown. Primaries deep brown with two fine white basal streaks; one running along the costa for a short distance, then gradually bending downward and running along the subcosta to about the basal third; the second streak runs along the fold to nearly the middle of the wing; a third white streak begins below the fold about the basal third and becomes orange yellow as it reaches the very broad transverse band of the same hue; on the internal margin of the band are two violet-hued silvery spots; the one below the costa is limited by a conspicuous black discal spot; before the external margin of the band which is prolonged into an angle, is a costal and dorsal, violet-hued silvery spot; beginning at the angle of the band is a fine white stripe reaching the extreme apex of the wing. Secondaries and wings beneath fuscous. Expanse, 7 mm.

1 ♂. Coll. W. B. Hab.—Central Florida.

Some Studies of the Development of Lixus concavus, *Say*, and L. macer, *Leconte*.

By F. M. Webster.

Concerning the habits and transformations of the twenty-five species of the genus *Lixus*, inhabiting North America, North of Mexico, very little appears to have been learned: the limited information we possess relating exclusively to but three species.

From the fact that adults of *Lixus rubellus*, Rand, have, on two occasions, been observed in considerable numbers clinging to the blossoms and leaves of an aquatic plant, *Polygonum amphibium*, this insect is suspected of infesting that plant, the theory being strengthened somewhat by the fact that *L. paraplecticus*, an European species, breeds in the stems of *Sium*, or Water Parsnip. (Rep't Com. Agr., 1870, p. 71.) The larvæ of another European species, *L. angustatus*, is said to mine in the stalks of beans.

Lixus parcus, a native of California, is said by Prof. Riley to form galls in the stems of *Amelanchier*. (Proc. Ent. Soc. Wash., Vol. I, p. 33.)

A single short notice, printed in 1866, by Mr. Townend Glover, contains all the published information we have respecting the life-history of *concavus*. Mr. Glover states that he observed the female beetle "burrowing into the foot-stalks of rhubarb, or pie-plant, and there depositing a single egg in each hole." The observer failed to rear the young, however, as the latter died in a few days, as soon as the stalks became withered. (Rep't Com. Agr., 1865, p. 90.)

Of the early stages of *macer*, we likewise have but little published information. Prof Riley reared it in 1872 from *Chenopodium hybridum*, but the girdling habit of the larvæ was not observed by him. (Loc. Cit.) Mr. D. W. Coquillett, in a short article published in 1883, (Can. Ent., Vol. XV, p. 113), states that on July 13th, 1881, near Woodstock, McHenry County, Illinois, he observed a female of this species busily engaged in gnawing holes in the stems of a green *Helianthus grosseserratus*, or Wild Sun-flower. There were several holes in the stem, and in each he found one or two eggs, of an elliptic ovoid form, polished, pale yellow, and measuring about two and one-fourth mm. in length. In the stems of other similar weeds growing near by, he found several recently hatched larvæ. Stems of the same species of weed were examined during the Summer, and larvæ in different stages of their growth were observed, sometimes two or three in the same plant. Late in October, pieces of these stems, from one and a half to three feet long, were found lying about on the ground, evidently having been gnawed off from within, excepting the thin, outer bark, which had apparently been broken by the wind. These pieces contained a larva, evidently of the same species as those previously observed; and similar larvæ, but no pupæ, were observed in the prostrate stems, on the 25th of the following April. From these observations, Mr. Coquillett opined that the beetles deposited their eggs in mid summer; the larvæ, hatching in a few days, reached their full growth in three or four months, and, hibernating in the stems in that stage, changed to pupæ early the following Summer, emerging as adults soon after.

At the time Mr. Coquillett was making these observations, we, in an adjoining County of the same State, were similarly engaged, although as ignorant of his studies as he was of ours. However, with the exception of securing more facts relative to the mode of oviposition, and the number of eggs, and the grouping of the egg chambers, we did not materially improve upon his observations, as afterwards published.

In Northern Illinois, where we always found *macer* to be the most common species of *Lixus*, *concavus* seldom occured in our collections. In Central Illinois, in 1882 and 1883, we found the latter to be the more abundant species, while the former was seldom observed. We were more surprised to here observe *concavus* ovipositing in the stems of *Helianthus*, exactly as we had observed its congener do in the Northern part of the State.

The female, of either species, in depositing her eggs, first places herself, head downward, upon the stalk in which she intends to oviposit, and, without moving the feet, commences a series of backward and forward movements of the rostrum, gouging out a narrow channel, varying from three-fourths to about an inch in length, penetrating through the woody portion of the stem to the pith. This channel is not clean cut, but is, when finished, filled with matted fibre, not detached and not easily removed. From near the upper end of this channel, the female next excavates a burrow, of the diameter of her rostrum, directly into the pith, for a considerable distance; thence upward as far as she can reach. While we have never observed the sexes *in coitu*, nor the placing of the egg, the male is almost invariably present *in situ*, and we have often interrupted the female in the midst of her work, and found an egg partly in place in the stem. These observations leave little room for doubt that the eggs are fecundated just prior to the act of oviposition, and dropped by the female at the mouth of the burrow, being afterwards pushed in place by aid of her rostrum.

Wherever there was good evidence of the nidus having been completed, we have always found a second chamber or burrow, at the lower extremity of the channel also, but not extending far enough upward to come in contact with the upper. In each of these chambers we have always found two eggs; the first at the upper extremity, and fastened by some adhesive substance on the egg itself. Back of this egg, a piece of pith seems to be shoved in, to aid in holding it in place, and to hold it from the second egg, which is placed directly behind this, and frequently, but not always, a piece of pith is placed behind the latter also. While it might be too much to say that the invariable number of eggs is two, in each chamber, and that there are always two chambers connected with each channel, with a single exception we have found this to be the case. In the exceptional case, there was a channel fully twice the ordinary length, and four chambers connected with it; the second and third, however, being much more distantly placed than the first from the second, or the third from the fourth. Just why so much method should be followed in this arrangement, it is difficult to understand. Possibly the female may comprehend that were she to place herself in a reverse position on the plant, the chambers would extend downward and a drop of water or dew, on its way downward on the outside of the stem, might penetrate the latter and destroy the eggs, the young larvæ, or even the entire plant. As it is, the chamber extends upward, and, besides, the gum, which exudes from the plant, collects in the mass of fibres in the channel, and as this gum hardens it tends to seal the whole entrance. The secret of the number of egg chambers, per each channel, may lie in that the latter is as long as the female can make it without changing her position, as, with the weight of the male added to her own, moving about would prove too laborious. With two eggs in each chamber, there need be no conflict among the young larvæ, as one can work upward and the other downward; the only chance for a conflict here being, that the lower one of the upper chamber might come in contact with the uppermost larvæ of the lower chamber. They are certainly not quarrelsome, however, as we have taken thirteen full grown larvæ from a section of *Helianthus* only about as many inches in length.

The egg of *Lixus concavus* is oblong-oval, smooth, of a very light yellow color, 1.5 mm. long, and 1 mm. in diameter.

As to the time required for these eggs to hatch, after being deposited, I have no exact data, but think Mr. Coquillett's opinion respecting those of *L. macer*, would apply to *concavus* also, as my own observations indicate that the period covers only a few days.

In the latitude of LaFayette, Indiana, the eggs are deposited during July and early in August, the larvæ becoming full grown by the 20th of October. In the stems of the plant, these larvæ are rather contracted, and remain, when quiet, in a somewhat curved position, being then only about 18 mm. in length.

The extended larva is 21 to 23 mm. long, of a nearly white color; head, smaller than first segment of body, somewhat oblong, slightly narrowed anteriorly, brown, with inverted Y mark, and sutures at base of mandibles, white; at the juncture of the two branches of the Y mark, is a crescent shaped, white space, thickly blotched with brown; the concave side of this space is downward, and the branches of the Y mark, in a measure, form its outline; front depressed between branches of Y mark with a narrow, straight dark line, extending from their confluence to near frontal suture, lower margin strongly ridged. On each side of this dark line are three setigerous depressions, and there are several longer setæ on the sides and vertex. Antennæ rudimentary. Just above each of these is a setigerous puncture, and again just above these is a small semi-translucent spot. Eyes wanting. Mouth parts, light brown; mandibles darker, stout, concave on inner side, bifid at tip, the lower portion being shorter and more curved, with a small, broad tooth on inner margin. Body, wrinkled, increasing from head to third segment, then decreasing to fifth, sixth to eighth equal, ninth larger, tenth still larger, eleventh smaller, twelfth much smaller, sub-convex and cypeiform behind, with anal aperture in center of disc. The first ten segments are divided above by two transverse wrinkles, forming two long and one short transverse folds on each, the latter being placed anteriorly. The eleventh segment has but one wrinkle, and the twelfth none at all. The first segment is larger than the head, with light brown patch resembling a cervical shield, which is divided by a median, lineal white line, and, bearing on front and posterior margins, a transverse row of short bristles. There is also a cluster of four bristles at each end of the cervical shield, and between it and the spiracle; on the second fold are two, small, light brown patches, divided by a dorsal, white line, each patch bearing a single bristle. The second segment has also a transverse row of bristles, and besides there is also one placed singly on each side of a slight, medial depression. Segments three to eighth with similar row of small bristles only, the ninth having a single bristle on each side of the fold near the middle of the back. The tenth segment has a row of larger bristles, and two on each side of fold. On the eleventh, the bristles are still longer, and inclined to form clusters at the sides, near the spiracles. On twelfth segment, the bristles form a semi-circular cluster. On each segment, except the second and twelfth, is a double row of obtuse, yellowish pustules, placed just below the spiracles, each bearing a few, short, scattering bristles. Between these rows of pustules is a deep, lateral groove, and, where this crosses the segmental wrinkle, a deep, quadrangular fossa is produced.

Beneath, the feet are wanting, and their place supplied by pustules, upon each of which are eighth ambulatory setæ, one of the number being somewhat isolated and near the middle of the segment. On all twelve segments are four, short setæ, placed in pairs each side of the middle ; those on the thoracic segments being between the isolated setæ, just indicated.

The pupæ average 16 mm. in length. In the female, the rostrum reaches considerably beyond the base of anterior femora, while in the male it extends very little beyond. On the rostrum, head and thorax are a few, sparsely placed bristles.

Beneath, the nine segments are smooth, distinctly separated, and with a few short bristles. Above, the first segment is smooth, with exception of the scutellar turbucle; the second is smooth, but on the third, fourth and fifth, each, is a transverse row of fleshy spines, ending with chitinous points, and placed near the posterior margins of the segments. On the sixth, the spines are larger and almost dactyliform, being placed on a transverse, fleshy ridge. On the seventh segment, this ridge assumes a comb-like appearance, and is divided at middle, and on each of the parts thus constituted are five fleshy spines, all much larger and longer than any on the preceeding segments. The eighth segment is nearly vertical, unarmed, but slightly wrinkled and conspicuously setigerous. The ninth segment is nearly horizontal below and opposite the eighth, or curled under, as it may be called. This is armed with two, widely separated proleg-like appendages, each terminating in a stout, chitinous hook, with the point turned directly backward. Abdomen, slightly broadest at third and fourth segments. The spines above described are doubtless to enable the pupa to push itself into a position favorable to the escape of the adult, which, within the stems of the plants, must be well nigh helpless.

When full grown, the larvæ girdle the stems from within, at irregular intervals, much as does the larvæ of *Elaphidion* within the twigs of oak, hickory and other trees, except that only the thin outer bark is left intact, to be broken off by the winds ; the object being to give the larva time to withdraw into its burrow and plug up the opening. In proof of this the ends of the stems are filled with fibrous matter, taken from within the stem. Doubtless this girdling is done during a calm time, else the wind would surprise the larva with its work but half finished, but how it obtains a knowledge of the state of the weather outside, is a problem.

Notwithstanding all their precautions in filling the cavities at the ends of the stems, they are far from safe in their woody abodes, as, while protecting them from enemies of their own kind, even the thick walls are no protection from the cruel beak of the wood-pecker, and hundreds of these larvæ are dragged from their Winter-quarters to satisfy the insatiable greed of these birds.

The stems of the plant are not girdled by the larvæ until the former are quite dead, and hence, the plant is not materially affected, and sections are not to be found scattered about on the ground much before October.

As a rule, *concavus*, and probably *macer* also, hibernate in the larval stage, but the former, at least, sometimes live over in the adult stage, as we have elsewhere shown to be true of another species of *Curculionidæ* (Rep't Com. Agr., 1886,), whose transformations are quite similar in point of time. I have found adults of *concavus*, on December 4th, and again in April of the following year, while in May I could find only larvæ. I have found healthy larvæ in stems dug out of ice and frozen snow in January, and found them during the four months following, but have never been able to ascertain the time required in which to pass the pupæ stage, or the exact season during which this takes place, but opine that it will prove to be late in May and during June. My examples of the pupæ were from stems containing larvæ, kept in-doors. These transformed in January, and the pupæ period occupied only a few days.

I have found larvæ only in *Helianthus* and have repeatedly observed the adults feeding upon the foliage. In a single instance I observed a female ovipositing in *Silphium*, or Rosin weed, and it is quite probable that they may be found in the stems of other, similar plants, besides *Chenopodium*, as observed by Prof. Riley.

I have not studied the larvæ of *macer* enough to find a ready distinction between them and *concavus*. They are usually more slender and less wrinkled, but it is doubtful if this holds true in all classes. The pupæ are more slender, and the rostrum and anterior femora are much longer, and these afford a good basis of separation.

The knowledge which I have obtained regarding the habits of both these species, would indicate a closer relationship between the two, than now accorded them, but much more remains to be learned of their habits in other localities, and, especially where both are common, if such a place can be found, before the question of relationship can be satisfactorily settled; and it is with a hope of inciting such researches that these notes are given.

Notes upon the Habit of Pleocoma.

By J. J. Rivers.
(University of California.)

It is known that the autumn rain, when copious, makes the *Pleocoma* season and during the latter part of last week from the 14th to the 17th of November there was a rain-fall of five inches. The 18th was a fine *Pleocoma* day with warmth and sunshine. I visited well-known haunts of *P. Behrensi* but without reward. I found some burrows that had the correct look of a beetle tunnel but my tools were unequal to a proper investigation. The same day, meeting a friend, I was informed he had a "bug" for me that was drowned in a pool, formed by the heavy rain. This proved to be a large male of *P. Behrensi.* Mr. Oscar Baron found that *P. fimbriata* took wing in the rain, which observation is new. The late Dr. J. L. Leconte, in a letter some years ago, told me to try for the capture of *Pleocoma* by the means of artificial light in the night time. This method was not credited by some of my confreres because the general experience had been to find them flying in the day time and usually on the first fine day following the first heavy rain of the season. But the experience of Mr. Oscar Baron again steps in and corroborates Dr. J. L. Leconte's account of the habit of flying by night. Mr. Baron occupied a tent during a rain-storm in November, 1887, and while taking his evening meal was surprised by a visitation of a number of *P. fimbriata* entering his tent, charging upon his light and extinguishing it and then falling into his soup—thus becoming an unruly visitor.

These observations go to show that the habit of *Pleocoma* is not strictly diurnal, nor is it nocturnal, but that their habit is to travel both by day and night and that, too, either in the sunshine or in the rain.

November 21st, 1888.

◆

A New Pleocoma.

By J. J. Rivers.
(University of California.)

This insect through the form of its antennæ shows a special affinity with two others of the genus and these three possessing fundamental correlated characters naturally come together as as a specialised section. The three referred to are *P. Rickseckeri*, *P. fimbriata* and the one now to be described. The new one is most like *P. Rickseckeri.*

Pleocoma puncticollis, n. sp.

Broadly oval, shining black, fimbriate with long black hair, having a tendency to rustiness. Head small, eyes large, clypeal horn reflexed bifurcate or deeply emarginate, the apices being obtuse : vertex with horn only impressed at tip and scarcely emarginate, face of horn flat and granulated ; genæ have the front margins straight with their apices obtuse or truncate. Antennæ stouter than in the allies, the 3rd joint being longer than the 4th and 5th combined, the 6th transverse, compressed on the upper part from which proceed several short setæ, the 7th joint transverse with longer and more numerous setæ, the 8th joint shorter and much narrower than the 11th, the 9th and 10th being nearly equal and longest. The color of the lamellate portion dull brown. Thorax twice as wide as long and wider than the elytra at their juncture ; hind angles prominent, sides arcuate, front angles rounded; on the front margin originates a median channel intercepted by a bold swelling on the discal area ; there are also slight depressions at the side and front margins ; the whole area of the thorax is coarsely and closely punctured (almost rugosely punctate). Elytra of the usual form but the whole surface is smooth and shining, the geminate striæ being represented by rows of punctures at wide intervals and the general sculpture is of the faintest kind. The legs and abdominal surface clothed with long black hair, having a slight rustiness of tone. One specimen. Length, 26 mm.

Collected in November by G. W. Dunn in the Cuyamaca Mts., 8 miles from Julian, Cal.

P. puncticollis differs from *P. Ricksekeri* by the former being heavily punctured all over the disc of the thorax, while in the latter the same part is sparsely and lightly punctured ; there is also the same amount of difference between the sculpturing of the elytra of the two but inversely, the surfaces of *P. puncticollis* being smooth while in *P. Ricksekeri* they are ornamented with wrinkled elevations.

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North American Microlepidoptera.

By Prof. C. H. Fernald.

(Amherst, Mass.)

Tortrix citrana, n. sp.

Expanse of wings, 20 mm. Head, palpi, thorax and fore wings, cinnamon brown, varying somewhat in different specimens. The palpi are porrect, compressed laterally, and the last joint is short and blunt. The thorax has a very small tuft behind which is tipped with ferruginous. The fore wings are crossed by an oblique, dark brown band which arises from the middle of the costa and the outer edge ends near the anal angle while the inner side becomes diffuse and shades the basal portion of the wing below the subcostal more or less completely. A triangular brown spot rests on the outer fourth of the costa. The surface of the wing, when viewed obliquely appears to be crossed by a large series of irregular stripes of lead-colored scales. The terminal line is dark brown when present, and the fringes are cinnamon brown. Hind wings white, tinged with steel-gray on the anal portion. Underside of the body and wings, pale yellowish.

Bred from Orange in California, by Mr. Coquillett. I have also seen one from the leaves of Solidago and one from Willow, all from California.

Book Notice.

An Introduction to Entomology, By JOHN HENRY COMSTOCK, Ithaca, N. Y., 1888. Published by the author. Part I, pp. I to VI and 1 to 234, ff. 201.

This book, so far as it goes, fills one of the spaces so long left vacant by American writers. It presents in a form, suitable for use in the class-room, the essential parts of Insect Anatomy and even goes further, and lays the basis for an ability to continue independant and original observation. Not only to the student in the class-room is it valuable however—it had missed a large field of usefulness else—but also to the enterprising young man or boy with an intense longing to know something about general Insect structure, but without money to buy a library or access to any large Public Library. So far as it goes, it comprises Chapters on the Anatomy and Metamorphoses of Insects, the general or Ordinal Classification, and the Classification of the *Thysanura*, *Pseudoneuroptera*. *Orthoptera*, *Physopoda*, *Hemiptera* and *Neuroptera*. The general plan throughout is to give at once a tabular or synoptic statement of the classification, and then in a somewhat more elaborate manner to define all the divisions so far as within the scope of the work. These synoptic or tabular statements constitute one of the most useful and unique portions of the work, and in this alone Prof. Comstock's book will be entitled to the highest commendation. It is really what it pretends to be,—an Introductory work, in which any one interested can obtain a knowledge of the general classification of Insects. The adoption of the more simple of the ordinal divisions, deserves commendation. The more, as the minute and complex divisions of some of our more modern Authors are sufficiently indicated. Taken as a whole, it is by far the most practical and generally useful work that has been published in America. But while thus emphatic and sincere in its praise, we cannot forbear to call attention to what we consider imperfections which can perhaps be obviated in the other parts of the work. The description of the anatomical details is somewhat unnecessarily dry: the subject might have been made somewhat more interesting and attractive to the individual student. A more serious objection is to the illustrations: some of the original drawings are undeniably poor. In some, even those showing anatomical details, the artist, by close line shading, has made the drawing very obscure, where the simple outline would not only have answered the purpose better but would have printed more clearly. The lettering and numbering of details are often indistinct where the greatest clearness would seem to be indicated. Few of the original illustrations are of a really high character. While we are glad to see that Prof. Comstock has very largely restricted the use of the special terms (caudad, ventrad, &c.), proposed by Prof. Wilder, we think their omission in some of the cases where used would have been of decided advantage: for instance, on page 10, he says "The *genæ* or cheeks are the lateral portion of the epicranium, which are usually ventrad of the eyes and caudad of the mandibles." Would it not have been just as accurate, just as scientific, and much more intelligible to have located them *below* the eyes and *behind* the mandibles? We really cannot see the advantage of the unnecessary use of unusual and ultra-technical terms in an Introductory work. With these small faultfindings, we most heartily recommend the book to all students of Entomology, old or young.

Washington, D. C. JOHN B. SMITH.

Books and Pamphlets received during Oct. and Nov., 1888.

October.

Prairie Farmer, Oct. 1888.
Proc. Amer. Ass'n for Adv. of Science, Vol. XXXVI, 1887.
West American Scientist, May, 1888.
Ottawa Naturalist, April and June, 1888.
Review of Species of Pleocoma, by Dr. Geo. H. Horn.
Obs. on Corn Insects, by F. M. Webster.
Report on Insects of the Season in Iowa, by H. M. Osborn.
Journal Trenton Nat. Hist. Society, No. 3.
Journal of Cinn. Society of Nat. History, Vol. II, Nos. 2 and 3.
Canadian Naturalist, Vol. XX, Nos. 10 and 11.
Hawk Moths of North America, by A. R. Grote.
Le Naturaliste Canadienne, Vol. XVIII, No. 3.
Naturae novitates, Nos. 17 to 20.
Correspondenzblatt des Entomologischen Vereins "Iris" zu Dresden, Vol. V.
Horae Societatis Entomologicae Rossicae, Vol. XXI.
Bulletin de la Société entomologique Suisse, Vol. VIII, No. 1.
Comptes-rendus de Séances de la Société entomologique de Belgique, Nos. 1—5.
Verhandlungen der Kaiserlich-Königlichen zoologisch-botanischen Gesellschaft in Wien, Vol. XXXVIII, Nos. 1 and 2.
Bulletin de la Société Imperiale des Naturalistes de Moscow, Nos. 1 and 2, 1888.

November.

Prairie Farmer, November, 1888.
Naturae novitates, Nos. 16 and 21.
Ottawa Naturalist, September and October, 1888.
Preliminary List of Myriapoda of Arkansas, by Chas. H. Bollman.
18th Annual Report of Entomological Society of Ontario, 1887.
Entomologiske medelleser udgivne of Entomologisk forening, ved Fr. Meinert, Copenhagen, 1888.
Comptes-rendus de la Société Entomologique de Belgique, No. 104.
Introduction to Entomology by Prof. J. Henry Comstock, Part I.
Trans. Amer. Ento. Society of Phil., Vol. XV, Nos. 2 and 3.
Proc. of Acad. of Nat. Sciences of Phila., Part 2, 1888.
Psyche, No. 149 and 150.
Report of Prof. Riley, U. S. Entomologist, for 1887.
Journal N. Y. Microscopical Society, Vol. VI, No. 4.
Bulletin 2 and 4 of Experiment Station of College of Agriculture, University of Minnesota.
Annales del Museo Nacional, Republica de Costa Rica, Part II, 1888.

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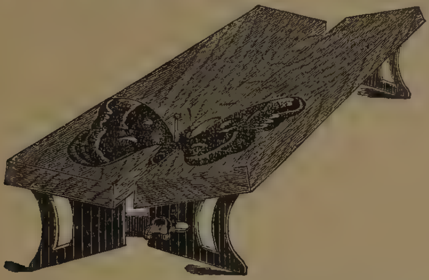

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ENTOMOLOGICA AMERICANA

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A GENERIC SYNOPSIS OF THE FULGORIDÆ.

By Wm. H. Ashmead.

[Continued from p. 6.]

(Family II. FULGORIDÆ.)

Subfamily VI. DICTYOPHARINÆ.

TABLE OF GENERA.

Head as broad as the prothorax, arcuated before......G. 1. **Cladypha**, A. et S.
Head narrower than the prothorax.
  Elytra with small and quadrangular cells of the same size; head rather small, rounded before............................G. 2. **Pterodictya**, Burm.
  Elytra with forked nervures and elongated cells, less numerous at their basal half; head more or less prolonged beyond the eyes.
    Elytra not separated into two parts by an elevated line..................2.
    Elytra divided into two parts by an elevated, transverse line................ G. 3. **Dichoptera**, Spinola.
2 Elytra with basal cells somewhat elongated beyond the middle, followed by three rows of very small cells, narrow and arranged in a concentric half circle...... G. 4. **Lappida**, A. et S.
Elytra with the discoidal flap with an infinite number of anastomosing veins or ramifications, extending in all directions and distributing into an infinite number of cellules of different shape........G. 5. **Plegmatoptera**, Spinola.
Elytra not having three rows of cells arranged in a concentric circle at their extremity.
  Cephalic prolongation in a pointed or subcylindric cone; vertex narrow........ G. 6. **Dictyophara**, Germar.
  Cephalic prolongation but slightly longer than wide, rounded before; vertex large, flattened, facetted......................G. 7. **Monopsis**, Spinola.
  Cephalic prolongation long and slender; head with a distinct callosity behind the eyes; vertex with the lateral margins slightly dilated................ G. 8. **Scolops**, Germar.

SUBFAMILY VII. FULGORINÆ.

TABLE OF GENERA.

Head with a cephalic prolongation..3.
Head without a cephalic prolongation.
  Head broad without a longitudinal keel on the vertex ....2.
  Head very narrow with a longitudinal keel on the vertex.
    Mesothorax with three regular longitudinal keels, of which the two lateral ones are curved and united at the anterior margin ; frons broad, feebly keeled.. G. 1. **Aphana**, Guer.
    Mesothorax without keels ; elytra very large, one or more times longer than the body.......... ....G. 2. **Phenax**, Germar.
2 Head cut straight before the eyes ; a spine above each eye ; frons nearly vertical with three distinct facets .... G. 3. **Hypæpa**, Stäl.
Head curved before ; no spine above the eyes.
  Elytra opaque their whole length ; last dorsal segment not covering the extremity of the abdomen in the ♀ ....G. 4. **Piocera**, Laporte.
  Elytra coriaceous at the base only, last dorsal segment covering the extremity of the abdomen in the ♀ ....G. 3. **Calyptoproctus**, Spinola.
Frons nearly horizontal, divided into three not very distinct facets ; second joint of antennæ spherical..................... G. 6. **Homalocephala**, Spinola.
3 Cheeks without a spine or tubercle anteriorly..................................4.
Cheeks with a spine or tubercle anteriorly.
  Cephalic protuberance horizontally directed before, inflated and vesiculose..... G. 7. **Laternaria**, Stäl.
  Cephalic protuberance not at all inflated or vesiculose ; protuberance suddenly enlarged at its extremity......................G. 8. **Phrictus**, Spinola.
4 Vertex twice the breadth of the rounded eyes.
  Protuberance insensibly narrowing from the base to the apex .... G. 9. **Enchophora**, Spinola.
Vertex much broader than the eyes ; protuberance long, rounded or subtetragonal.
  Cheeks at apex before the eyes truncated ; frons at apex slightly sinuate, with two or three longitudinal keels ; feet slender, scutellum slightly keeled ; protuberance more or less curved...............G. 10. **Fulgora**, Linn.
  Cheeks at apex before the eyes rounded or subtruncately rounded ; frons at apex deeply sinuate ; scutellum not keeled ; protuberance straight.............. G. 11. **Pyrops**, Spinola.
Vertex very broad, both sides of frons at apex lobate, above the lobe upwards, more or less enlarged.
  Fifth dorsal plate of the abdomen operculiform, forming a covering for the following segment.............................G. 12. **Episcius**, Spinola.
  Fifth dorsal plate of abdomen of ordinary form.....G. 13. **Dilobura**, Spinola.

SUBFAMILY VIII. CIXIINÆ.

TABLE OF TRIBES.

A Ocelli 2 ; vein of clavus not reaching to the apex, or united with the commissural margin near the apex.
Last joint of the rostrum elongated, last joint of posterior tibiæ elongated.
  Head narrower than the thorax.

Sides of clypeus keeled...... ....Tribe I. ACHILINI.
Sides of clypeus not keeled ; thorax with three keels....................
Tribe II. TROPIDUCHINI.

Last joint of the rostrum short or very short.

Head sometimes not narrower than the thorax ; thorax not keeled or with one obsolete keel....................................Tribe III. DERBINI.

B Ocelli most frequently 3, the third ocellus on the apex of the frons and seldom wanting ; vein of clavus reaching to the apex, or united with the suture of the clavus near the apex............................Tribe IV. CIXIINI.

Tribe I. ACHILINI.

TABLE OF GENERA.

Anterior tibiæ about equal to the femora and trochanters united, or somewhat shorter.

Posterior tibiæ with one spine or without spines.

Head and thorax of equal breadth ....G. 1. **Plectoderes**, Spinola.

Head narrower than the thorax.

Vertex short, transverse, not or scarcely prominent before the eyes, or confused with the frons ; posterior tibiæ with one spine.

Vertex distinct, anterior margin obtusely rounded or angulated ; thorax twice as broad as the head ....G. 2. **Achilus**, Kirby.

Vertex, before the eyes, distinctly produced.

Eyes subrotund, beneath scarcely sinuate ; wings with elongate areas before the apical areas ; frons narrowed upwards..................
G. 3. **Helicoptera**, A. et S.

Tribe II. TROPIDUCHINI.

TABLE OF GENERA.

Vertex truncate at base ; thorax slightly and broadly roundedly sinuated at base..4.

Vertex emarginated at base ; thorax posteriorly angularly emarginated.

Radial vein forked before the middle or near the base of the wings...........3.

Radial vein of wings simple or behind the middle of wings, or at least much longer at the base than the forked interior ulnar vein.

Wings oval, convex, horny, sprinkled with dense, depressed granules, obsoletely veined...G. 1. **Grynia**, Stål.

Wings membranous, distinctly veined.

Head depressed ; frons subhorizontal ; wings with a series of strongly oblique transverse veins, extending straight posteriorly and outwardly to the apex of the clavus .... G. 2. **Tambina**, Stål.

Frons more or less reclining, never horizontal ; anterior tibiæ equal in length to the femora and trochanters united or somewhat shorter.

Lateral margins of clypeus distinctly keeled ; veins of clavus united very much behind the middle........ ....2.

Lateral margins of clypeus obtuse, sometimes slightly keeled at base ; wings extending much beyond apex of abdomen.

Wings with a double series of transverse veins toward apex, exterior ulnar vein simple.

Head short, somewhat prominent before the eyes ; vertex arcuate, very short ; frons not keeled, with two longitudinal impressions ; sides of clypeus slightly keeled at base ; veins of clavus united before the middle .... G. 3. **Rudia**, Stål.

Head moderately produced before the eyes ; vertex produced ; frons distinctly keeled ; costa remote from margin, sending out numerous transverse nervules.................... .... G. 4. **Numcia**, Stål.

2 Anterior tibiæ somewhat longer than the femora and trochanters united ; head short, somewhat prominent before the eyes, obtuse ; frons somewhat convexly reflexed at base, also without a keel at base ; sides of clypeus obtusely subcarinated.

Head very slightly prominent before the eyes .. ... G. 5. **Clardea**, Signoret.

Head very much produced before the eyes ..... G. 6. **Conchoptera**, Stål.

Wings subelongated, scarcely enlarged toward apex ; frons with a median keel, obliterated towards the base..... .... G. 7. **Isporisa**, Stål.

Wings toward apex gradually, greatly enlarged ; frons without a keel. ..... G. 8. **Paricana**, Stål.

3 Exterior margin of wing all greatly rounded ; radial vein forked nearer to the base than to the interior ulnar vein, emitting oblique branches .... G. 9. **Alcestis**, Stål.

Costal margin of wing scarcely or slightly rounded ; the radial and interior ulnar veins very much alike forked from base, without branches, costa remote from margin and emitting numerous transverse veins ; frons with one or three keels.

Head very greatly triangularly produced..... .... G. 10. **Daradax**, Stål.

Head slightly prominent before the eyes, obtuse....G. 11. **Tropiduchus**, Stål.

4 Body broad, oval, depressed ; wings depressed, slightly horny, reaching somewhat beyond the apex of abdomen.......................G. 12. **Gastrina**, Stål.

Tribe III. DERBINI.

TABLE OF GENERA.

Head narrower than the thorax ....2.

Head and thorax of equal breadth ....G. 1. **Fescennia**, Stål.

2 Antennæ with appendages at base ; last joint of rostrum twice longer than broad.. G. 2. **Otiocera**, Kirby.

Antennæ without appendages.

Second antennal joint oblong or elongated, apex with a sinus above............3.

Second antennal joint of variable length, subglobose or elongated, apex without a sinus above.

Antennæ remote from clypeus, inserted close to the eyes or behind the inferior part of the cheeks.

Wings from within behind the clavus, dilated, rather long, obliquely roundedly truncate at apex ; clypeus somewhat longer than the frons, narrow, with keels ; scutellum with three keels.................G. 3. **Flaccia**, Stål.

Wings from within behind the clavus not enlarged.

Head before the eyes strongly produced...............G. 4. **Persis**, Stål.

Antennæ inserted on the inferior part of the cheeks near the clypeus.

Head before the eyes very slightly prominent, compressed................. G. 5. **Phenice**, Westwood.

Head before the eyes greatly produced..............G. 6. **Halcita**, Stål.

3 Wings very broad at the middle, narrowed behind the middle.
Second antennal joint suboblong or somewhat elongated.......................
G. 7. **Mysidia**, Westwood.
Second antennal joint short, tuberculate with a dorsal seta....................
G. 8. **Ceuchrea**, Westwood.
Wings not so broad in the middle.
Second antennal joint elongated, sublinear, compressed, slightly obliquely truncate at apex, setigerous; head compressed, subtriangular, with two keels; frons subrostrate, rostrum straight; eyes prominent, sublunate.....
G. 9. **Anotia**, Kirby.

Tribe IV. CIXIINI.

TABLE OF GENERA.

Posterior tibiæ with one or three spines.
Head with three triangular or transversely quadrangular facets................2.
Head without facets, prominent.
Vertex pentagonal, angularly grooved posteriorly or sinuately curved; frons almost a right angle, twice longer than wide, high at its apex.
Elytra enlarged behind the clavus, covering one another; posterior tibiæ with one small spine in the middle ....G. 1. **Cixidia**, Fieber.
Elytra of equal breadth, posteriorly rounded not dilated; posterior tibiæ with three spines...............................G. 2. **Ommatissus**, Fieber.
2 Wings broadly triangular behind, trilobed at their exterior margin near the flexible suture ....G. 3. **Trirhacus**, Fieber.
Wings not lobed at their posterior border, feebly curved; pronotum strongly, subangularly incised posteriorly.
Mesonotum with three keels.......................G. 4. **Cixius**, Latreille.
Mesonotum with five keels.
Vertex elongate pentagonal; frons with the median keel simple at apex; scutellum with the intermediate keel feeble; posterior tibiæ with two spines...........................G. 5. **Hyalesthes**, Signoret.
Vertex more or less broadly pentagonal with sharp ridges; scutellum with all the keels distinct; posterior tibiæ with three spines.................
G. 6. **Oliarus**, Stäl.

SUBFAMILY IX. DELPHACINÆ.

TABLE OF GENERA.

Antennæ of variable length, the second joint longer than the first..............2.
Antennæ long, first joint longer than the second.
First antennal joint compressed, somewhat dilated above and below.
Anterior legs dilated, foliaceous..................G. 1. **Asiraca**, Latreille.
Anterior legs not dilated, simple.
Head as broad as the thorax; antennæ and legs moderate................
G. 2. **Areopus**, Spinola.
Head narrower than thorax; frons narrow, elongate, narrowed upwards; antennæ and legs long.......................G. 3. **Sparnia**, Stäl.
First antennal joint, subcylindrical, not compressed; legs long, simple.........
G. 4. **Hapalomelus**, Stäl.
2 Antennæ greatly lengthened, dilated...............G. 5. **Copicerus**, Schwarz.
Antennæ simple, cylindrical or somewhat compressed.

Antennæ somewhat shortened, first joint short.................................3.
Antennæ very long, first joint elongated.
Scutellum with 5 keels.
Anterior tibiæ longer than the femora and trochanters united.
Interior ulnar and radial veins of corium of equal length, forked at base.......
G. 6. **Hygyops**, A. et S.
Interior ulnar vein shorter than the radial, the latter forked at base........
G. 7. **Canyra**, Stäl.
Anterior tibiæ as long as the femora....................G. 8. **Livatis**, Stäl.
3 Head broader than thorax ....G. 9. **Amblycotis**, Stäl.
Head narrower than thorax or of equal breadth.
Elytra convex.....................................G. 10. **Rhinotettix**, Stäl.
Elytra flat or somewhat flattened.
Posterior tarsi shorter than their tibiæ...............................8.
Posterior tarsi as long as their tibiæ.
Side keels of pronotum oblique, shortened behind..............................4.
Side keels of pronotum attaining the posterior margin, divergent; frons with a median keel.
Vertex a long isosceles triangle, without grooves or foveæ, with a median keel extending from one extremity to the other, prolonged beyond the eyes nearly half their length; clypeus with a median keel; basal antennal joint about one-third the length of second, thick, cylindrical; posterior tibiæ with two spines........G. 11. **Tropidocephala**, Stäl.
Vertex elongated, quadrangular, more or less prolonged before the eyes; frons with a median keel biforked on the vertex; clypeus with a sharp median keel; basal antennal joint cylindrical, somewhat compressed, two-thirds the length of second which is cylindrical.................
G. 12. **Megamelus**, Fieber.
4 Frons with two distinct keels, or else feeble above or nearly effaced, or more or less longly peduncled toward clypeus...................................6.
Frons with one distinct median keel, entire or shortened, often scarcely visible.
Frons with the apex of vertex forming an obtuse angle; vertex pentagonal, short, as long as wide at the base; pronotum short, half as long as wide at the base, pronotum short, half as long as the vertex with a median keel; side keels robust when with short elytra, feeble when with elytra well developed...................................G. 13. **Delphacinus**, Fieber.
Frons at apex and vertex at apex, truncated; vertex quadrate or elongated nearly trapezoidal.
Vertex a short isosceles triangle, or transversely quadrangular slightly passing the eye ....5.
Vertex quadrangular, elongated or trapezoidal, twice as long as wide, passing nearly half or more than half its length before the eyes; first posterior tarsal joint much longer than 2 and 3 united, joints 1 and 2 deeply excised at the apex, their lobes straight.
Vertex elongated, trapezoidal, visibly wider at the nape of the neck than at the apex; frons elongated nearly hexagonal, widest about the middle or at the apical third.....................G. 14. **Chlorion**, Fieber.
5 Frons with keel entire or forked only at the apex...................................
G. 15. **Delphax**, Fabr. (= **Liburnia**, Stäl.)

Frons and vertex straight at the apex ; vertex quadrate ; elytra clear in their two forms, but also black or brown when they are short, sometimes fringed with white..7.

6 Frons and vertex obtusely angular at apex, sides elevated at the base, pressed against the eyes at apex ; head seen from the side short, cone-shaped ; vertex before pentagonal ; body short and black, even as are the elytra which are coriaceous.

Frons with two sharp keels curved outwardly, approaching very close and converging at the apex, slightly separated from each other at the clypeus which is convex and without keels..................G. 16. **Jassidæus**, Fieber.

Frons with feeble traces of 2 keels, more distinct in the ♀, very rarely found in the ♂ ; clypeus convex with a short and feeble keel, sides keeled.......... G. 17. **Metropis**, Fieber.

7 Frons with the keel forked much before the vertex .... G. 18. **Dicranotropis**, Fieber.

Frons with 2 sharp keels as far as the vertex parallel, afterwards coming together at the level of the clypeus.........................G. 19. **Achorotele**, Fieber.

8 Frons with two distinct keels.... ....11.

Frons without a keel or only feeble traces of a keel ....10.

Frons with a distinct median keel.

Frons long, narrowed, much narrowed towards apex, sides generally curved outwardly, at the apex a sharp, biforked keel extending nearly to the angles of the nape of the neck, with an angular keel between the two branches ; wing nerves strong, prominent ; basal antennal joint short, almost as long as wide........................G. 20. **Stenocranus**, Fieber.

Frons elongated, nearly hexagonal, wider towards the inferior angles of the eyes, its apex ordinarily truncate, very rarely curved ; the median keel feeble, generally curved, sometimes straight, lost at the apex, again distinct on the vertex and forked towards the angles of the nape of the neck ; basal antennal joint short, a little longer than wide...........G. 21. **Kelisia**, Fieber.

Vertex short, an isosceles triangle or transversely triangular, slightly passing the eye ... .9.

Vertex elongated, quadrangular or trapezoidal, passing beyond the eyes, nearly, or more than half its length.

Vertex rectangular, not one and a half times as long as wide ; frons of nearly equal breadth between the eyes, a little narrower towards the apex and sinuated, about three times as long as wide at the clypeus ; median keel of frons sharp, forked before the apex to scarcely back of the middle of the vertex, shortened here by the angular projection and directed on the angle of the nape of the neck ; basal antennal joint cylindrical, more than twice as long as wide...... ....G. 22. **Euides**, Fieber.

9 Frons elongated, almost hexagonal, broader between the inferior angles of the eyes, towards the apex at the sides, short, towards the base at the sides, long, much narrower at the clypeus then at its apex which is straight, median keel sharp on the frons, which is smooth, forked before the apex, basal antennal joint short, thickened, compressed, prolonged to the middle of the cheek, slightly longer than half the length of the second ; the second joint seen from before broader at the base, slightly compressed, and with an elongated hump near its middle beneath, where there is a small groove at the prominent

border, superior part of joint narrower, cylindrical.................... G. 23. **Conomelus**, Fieber.

10 Frons rectangular, twice as long as wide, its sides smooth, somewhat emarginate; pronotum as long as the vertex with a sharp median keel; basal antennal joint long, cylindrical, reaching the extremity of the cheek, more than three quarters as long as the second, which is a little thicker, reaching to the extremity of the clypeal margins......... ....G. 24. **Kormus**, Fieber.

Frons elongated, almost hexagonal, broader at the middle, the sides feebly emarginated, sometimes nearly obtusely angular at the eyes, slightly more than twice as long as wide at the middle; pronotum visibly shorter than the vertex, posterior margin feebly grooved in an obtuse angle, the median keel feeble, the side keels distinct only at the base, obliquely curved around the eyes; basal antennal joint short, cylindrical, reaching almost to the middle of the cheek, thickened, about two-thirds the length of the second which is robust and slightly passes the frons..........................G. 25. **Eurysa**, Fieber.

SUBFAMILY X. TETTIGOMETRINÆ.

TABLE OF GENERA.

Vertex horizontal; frons obliquely directed, short; clypeus without keels and inserted in the extremity of the frons which is grooved, rounded............... G. 1. **Tettigometra**, Latreille.

◆

Notes on *Zeuzera pyrina*, *Fabr.*

BY J. B. ANGELMAN.

August 14th, 1887, I took at an electric light in Newark, N. J., three specimens of this insect. Previous to that time I had never seen a specimen of the insect taken in America, nor had it been taken so far as I could learn by any of the Newark collectors.

In 1888 I took the insect again. The first specimen was taken on June 14th, and I continued taking others at intervals up to as late as Sept. 27th. Altogether I took 45 males and 1 female. The latter was not taken at light as were the others but was found on the side-walk after it had been stepped on by some passer-by. I learn from various collectors that it was taken quite commonly this year at the electric lights, and extending over a considerable length of time.

We can from the above be assured of two things: 1st,—that *Zeuzera pyrina*, Fabr., is permanently settled with us and exists in considerable numbers and a considerable range of country about New York. 2nd,—its time of appearance varies very greatly as I took it off and on for a period of 106 days during the season of 1888.

A List of the BUPRESTIDÆ of New England.

By Frederick Blanchard.

The present list of all the species of *Buprestidæ* known to me to have been found in New England, at the same time includes a strictly local list, the species quoted from Massachusetts without any authority, having occured in the immediate vicinity of Lowell.

As bearing upon the local fauna it might be mentioned that the Black Spruce grows near Lowell only in cold swamps though generally distributed farther north and in more elevated localities in this State. The Poplar mentioned is probably always the *Populus tremuloides*, although the *P. grandidentata* is also credited to this locality.

Two Buprestides only, appear to frequent herbaceous plants in such a way as to indicate the probability of their breeding in them, namely, *Agrilus imbellis* and *Pachyscelus lævigatus*. It seems quite likely however that *Taphrocerus gracilis* may in this respect be classed with them.

It will be observed that some species are noted as occurring on Pitch Pines and at the same time as breeding in White Pines. Many adult species frequent and feed upon the needles of the former, sometimes in very considerable numbers, while the White Pine yields very few specimens of any kind in beating. I suspect that many species breed indifferently in both of the Pines mentioned.

1. *Chalcophora virginiensis*, Drury.—Appears in the middle of May through June and into July and again in the Fall frequenting Pitch Pines (*P. rigida*). A living specimen was dug from a White Pine (*P. strobus*) stump in July. Another specimen is marked as taken Oct. 17, Mass.
2. *C. liberta*, Germ.—Appears with the above. One specimen is dated Aug. 2. A pair were once found dead in a Pitch Pine stump under rather curious conditions. Their burrows approached each other obliquely and the two specimens were tightly wedged together at the junction of the burrows about an inch from the outer opening. Mass.
3. *C. fortis*, Lec.—N. H., Henshaw.
4. *Dicerca prolongata*, Lec.—On trunks of young Poplars and on Poplar logs in June. Mass., N. H.
5. *D. divaricata*, Say.—June, July. Appears to breed in various deciduous trees. It has been dug from Red Maple (*Acer rubrum*) and also from Poplar. Immature specimens have appeared in Sept. Mass., N. H.
6. *D. caudata*, Lec.—Frequents Alders and Red Birches and is known to me to breed in the latter (*Betula nigra*). It appears in May, June, August and September. Mass.

7. *D. pugionata*, Germ.—This species appears to be confined to the common Alder (*Alnus incanus*). It appears in May. On Aug. 8th specimens occured that were evidently just out. Mass. I presume all of these early appearing species make their first exit in the late Summer, or early Fall, and hibernate.
8. *D. lurida*, Fabr.—On Hickory trees and logs. July, Oct. Mass.
9. *D. asperata*, Lap. & Gory.—Jan. 20th under White Oak bark. April 4th under a stone. Aug. 15th. Very rare with me. Mass.
10. *D. tenebrosa*, Kirby.—On Spruce wood piles and logs. June. Mass. N. H. var. *chrysea*, Mels., N. H. Revision, Leconte.
11. *D. tuberculata*, Chev.—N. H. Two specimens have occurred indoors in Lowell, but I do not know of its breeding here.
12. *D. lugubris*, Lec.—One specimen, Mass. Henshaw collection.
13. *D. punctulata*, Sch.—On trunks and foliage of Pitch Pines. Appears early in Spring and late in the Fall in warm days, and in one instance was found in mid-winter when the ground was covered deeply with snow. Mass.
14. *Pœcilonota cyanipes*, Say.—One specimen on the trunk of a Poplar. June. Mass.
15. *Buprestis lineata*, Fabr.—Both spotted and striped specimens on Pitch Pines in July. A specimen was dug from a White Pine stump. Mass.
16. *B. consularis*, Gory.—On Pitch Pines. July and Aug. Mass.
17. *B. Nuttalli*, Kirby.—Brookline, Mass. Henshaw.
18. *B. maculiventris*, Say.—Spruce wood piles and logs. Mass., N. H. Rare here.
19. *B. fasciata*. Fabr.—N. H.
20. *B. sulcicollis*, Lec.—N. H. One specimen on a Pitch Pine. May 30th. Maine, Henshaw.
21. *B. striata*, Fabr.—Two specimens dug from a White Pine stump May 4th. It has also appeared in June, but is rare with me. Mass. All the specimens seen from this locality are dull colored with the exception of one individual which was taken in Lowell as it emerged from a White Pine window sill just as the sash was raised. The timber thus inhabited was probably western.
22. *B. ultramarina*, Say.—Very rare. Beaten from Pitch Pines in May. One specimen was split from a Pitch Pine knot. Mass.
23. *Cinyra gracilipes*, Mels—Two specimens were taken on the shady side of a White Oak trunk in hot weather, Aug. 8. Mass.
24. *Melanophila longipes*, Say.—Found here only about buildings and is probably introduced in northern lumber. May, Aug. Mass.
25. *M. Drummondi*, Kirby.—Abundant on Spruce logs and about

Spruce wood piles (*Abies nigra*). N. H., Mass. A bright blue-green form of larger size considered by Dr. Horn as a var. of this species occurred at a considerable elevation on Mt. Washington on a freshly peeled Fir or White Spruce (*A. balsamea* or *alba*).

26. *M. fulvoguttata*, Harr.—Only a few specimen seen. One was taken on a Hemlock log which was riddled with holes corresponding in size with this species in N. H. I have a specimen from a section of North Carolina, where Hemlocks are abundant, but where there are no Spruces or Firs. Harris' Ins. Inj., says he has taken it from the trunks of the White Pine. Possibly it was in the vicinity of Hemlocks.

27. *M. æneola*, Mels.—Beaten from Pitch Pines in July. Not common.

28. *Anthaxia æneogaster*, Lap.—On Buttercups in the vicinity of Spruces. Mass., N. H.

29. *A. viridifrons*, Lap.—On and about the Amer. Elm. June. Mass.

30. *A. quercata*, Fabr.—On Oak shrubs. Common. Mass.

31. *Xenorhipis Brendeli*, Lec.—Two males, one of them beaten from an Oak. Mass.

32. *Chrysobothris femorata*, Oliv.—Common on Oak wood and timber. A var. with the tips of the elytra narrower and cupreous, occurs on the White Birch (*D. alba*). Varieties *Lesueuri* and *soror* frequent Hickories. Mass.

33. *C. floricola*, Gory.—Abundant on Pitch Pines. Mass.

34. *C. dentipes*, Germ.—Not rare on Pine wood and timber, but not nearly so common as the last, nor does it appear to frequent the foliage of living trees to any great extent.

35. *C. trinervia*, Kirby.—On Spruce logs. N. H.

36. *C. Blanchardi*, Horn.—On trunks of sapling White Pines. Also dug out of dead trees of the same species. July, August. Mass. Not very common.

37. *C. scabripennis*, Lap. & Gory.—On White Pine wood piles, etc. Mass. On Spruce logs, N. H.

38. *C. pusilla*, Lap & Gory.—Beaten from Pitch Pines, common. May to August.

39. *C. sexsignata*, Say.—Rather scarce. Beaten from Pitch Pines. June to August.

40. *C. azurea*, Lec.—Three specimens, June and July on Sumac (*Rhus glabra*). In ENTOMOLOGICA, Vol. II, p. 231, this species is mentioned as having been found in numbers on a species of Dogwood. Besides the species of *Cornus*, *Rhus toxicodendron* is also called Dogwood here. The occurrence of the three specimens mentioned is of course by no means conclusive evidence.

41. *C. Harrisii*, Hentz.—Beaten from White and Pitch Pines, June to Aug. It breeds, according to Harris, in the small branches of the White Pine.

42. *Acmæodera culta*, Web.—Occurs on the flowers of the Wild Rose, Cranesbill (*Geranium maculatum*) etc. I think it breeds in dead Pines. Common. Mass.

43. *A. ornata*, Fabr.—Mass. Leconte, Revision Buprestidæ.

44. *Eupristocerus cogitans*, Weber.—Abundant on the foliage of Alders. June, July. Mass.

45. *Agrilus ruficollis*, Fabr.—On Blackberry (*Rubus*). June, July. Mass.

46. *A. torquatus*, Lec.—Rare. Mass.

47. *A. fulgens*, Lec.—On the Hazel (*Corylus Americana*). Not very common. June, July. Mass. Specimens found here are shining brassy or coppery.

48. *A. otiosus*, Say.—Very common on Oak shrubs. June, July. Mass.

49. *A. bilineatus*, Web.—Not rare on Oak foliage, logs, stumps, &c. July. Mass.

50. *A. vittaticollis*, Rand.—Taken occasionally in June, feeding on the leaves of Thorn (*Cratægus*), Shadbush (*Amelanchier*) and Chokeberry (*Pyrus arbutifolia*). Mass.

51. *A. granulatus*, Say.—Breeds in and frequents the stems of partly dead Alders. but does not appear on the foliage very much. It was found in considerable numbers in a single limited locality though usually quite scarce. June, July, Mass.

52. *A. interruptus*, Lec.—On foliage of Oak shrubs. Not rare. June, July. Mass.

53. *A. acutipennis*, Mann.—With the last. Not rare. June, July. Mass.

54. *A. anxius*, Gory.—Foliage of Poplar sprouts. Very rare. July. Mass.

55. *A. torpidus*, Lec.—A few specimens were taken on the summit of Mt. Washington, N. H., whither they had flown from below. The form described as *gravis* occurs in Mass. on Poplar sprouts and trunks.

56. *A. politus*, Say.—Common on low Willows. June, July. Mass.

57. *A. imbellis*, Crotch.—Occurs on *Helianthemum canadense* in June to August. Mass.

58. *A. egenus*, Gory.—I find but few specimens of this in my collection and do not know about its habits. Mass.

59. *Taphrocerus gracilis*. Say.—Taken in sweeping low herbage. May to July. Common. Mass.

60. *Brachysorata*, Web., *ærosa*, Mels., and *æruginosa*, Gory. All appear most frequently on Oak foliage, though sometimes on other deciduous trees. May to July. Mass.

61. *Pachyscelus purpureus*, Say.—Rare with me. It has occured at least once on Hickories, but I do not feel confident that that is the food plant. July, Sept. Mass.

62. *P. lævigatus*, Say.—Abundant on Bush Clover (*Lespedeza*). June, July. Mass.

On the origin of the genus Anthocharis, *Bdv.*

(= **Euchloe**, Hb.)

By T. D. A. Cockerell.

These delicate little butterflies, belonging to the genus *Anthocharis* of Boisduval, seem at first sight very aberrant members of the *Pieris* stock, with their one brood a year, narrow wings, and (in many species) orange apical patches on the forewings.

Yet in examining their characters as compared with those of *Pieris*, I have been driven to the conclusion that *Anthocharis* is by no means an ancient genus—as genera go—and that it arose directly from an old *Pieris* stock, and that probably on the American continent.

In stating the facts which have seemed to me to support such a view, it will be useful to review the peculiarities of the genus *Anthocharis*, and show how they may have arisen as offshoots from the stock from which the genus *Pieris* has also directly come.

Single-broodedness.—In Europe, *Pieris bryoniæ* of the Alps and far north is generally assumed to be the one-brooded ancestor of the double-brooded *P. napi* of the lowlands, and there is a tendency to assume that multiplication of the brood is a direct result of a warmer climate, and the idea of a single-brooded species arising from a double-brooded one seems not often to be entertained.

However, taking this same *napi* group in North America, we have still the assumed primitive type, *bryoniæ*, and likewise the forms *oleracea* and *venosa* to represent the European *napi*—so far the analogy is complete—but then we are met with what seems a strange anomaly, *Pieris virginiensis*, a delicate pale-winged form, appearing as a rare aberration in New York and Ontario, but actually as a spring-emerging one-brooded species in West-Virginia,—just exactly as if it were an *Anthocharis*, in fact! From this I think we get a clue as to the origin of *Anthocharis*—it did not arise from a one-brooded arctic form like *P. bryoniæ*, but was rather a branch from a stem which was probably *even then* double-brooded—and that accounts for its pallor and delicacy of structure, as fits an insect of the temperate zone.

Orange-tips.—Those species of *Anthocharis* which I regard as coming nearest to the primitive type of the genus,* do not present orange tips, but since these orange patches are so characteristic of many species it will hardly do to overlook them. In the first place, they are developed in the males—which seems to show that they are of the nature of secondary sexual characters, and have perhaps been perpetuated as such from what was once a very rare variety or aberration. Secondly, it is well to remember that both *Pieris rapæ* and *P. venosa* have yellow aberrations, and even possibly (as I have argued in "ENTOMOLOGIST," 1888, p. 112,) came from yellow ancestors,—and thirdly, in one species at least of *Anthocharis* (*A. cardamines*) there is an aberration (ab. *aureoflavescens*, see "ENTOMOLOGIST," 1888, p. 189), in which yellow takes the place of orange.

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* See also Darwin, "Descent of Man," 2nd Ed., p. 312.

Preparatory stages.—Dr. T. A. Chapman has an excellent paper ("ENT. MO. MAG.," 1888, p. 257), in which he compares the egg of *A. cardamines* with that of *Pieris rapæ*—pointing out that the egg of the former becomes orange, while that of the latter is never darker than a pale yellow—and further, that the eggs of *cardamines* are laid on the flower-heads. Having the eggs of no other *Pieris* at hand, he goes no further with his comparison, and it might be supposed that these differences were in some sense generic. But it is not so: *Pieris protodice* is very common in Custer Co., Colorado, and lays its eggs profusely on *Arabis*, *Sisymbrium* and other cruciferous plants. These eggs are *orange*, and are nearly always laid *on the flower-heads* of *Arabis*, though also frequently on the stem and leaves of *Sisymbrium*.

Anthocharis ausonides (var. *coloradensis*, H. Edw.) flies here in May, and lays its eggs in the same situations as *P. protodice*. This year I sent Mr. W. H. Edwards a number of young larvæ, presumed to be those of *protodice*—and certainly seeming all to belong to the same species. But on the 1st of July he wrote: "Out of my *protodice* larvæ I got on the 30th (June) several proper pupæ (a ♂ *protodice* emerged from one of them some days later) and one of *Anth. ausonides*. I had not noticed any difference in the larvæ: I thought sometimes some were blacker than others—more black hairs." So it will be seen that in the earlier stages *P. protodice* and *A. ausonides* have the closest resemblance—the larvæ, in fact, are not distinguishable.

From these facts, I am inclined to believe that *Anthocharis ausonides* on the one hand, and *Pieris protodice* and its allies on the other, come nearest to the primitive stock from which both arose—and it is favorable to the idea of the antiquity of *ausonides* that it is the one species of its genus in America ranging to the far north—even Alaska. Assuming this, we are perhaps at liberty to construct a hypothetical *Protopieris*, and imagine a butterfly inhabiting the American continent ages ago, in shape somewhere between the modern *Pieris* and *Leucophasia*—perhaps double-brooded—in markings, with a central black spot and dark apical patches to the fore wings, on the underside gray, marbling on the secondaries (for the green I take to be a subsequent arrangement of the yellow and black scales*)—in color, possibly saffron or brimstone yellow, though probably already white, or partly so.

WEST CLIFF, CUSTER CO., COLORADO, July, 1888.

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* And the green veining of the underside of *Pieris napi* is of the same nature—in neither case is there really any green pigment.

CORRESPONDENCE.

To the Editor of "Entomologica Americana."

The Address of Mr. J. B. Smith before the American Association for the Advancement of Science having elicited some comment on the part of several correspondents, I take the liberty of calling your attention to the fact of which Mr. Smith was ignorant at the time when he prepared his address, that the *entire collection* of Mr. W. H. Edwards of Coalburgh, West Va., has been purchased by the writer and forms a part of his collection of the Rhopalocera of North America. It is needless to say anything at length as to the advantages which flow to the writer in the matter of determining specimens of the Rhopalocera which may be kindly referred to him by correspondents. The collection with the additions of the collection of Mr. T. L. Mead, and additions made from the catches of various collectors from all over the United States is probably the most perfect collection in the world of the Diurnal Lepidoptera of Temperate North America. There are only a very few species hitherto catalogued as from this faunal region which are not represented and they are: *Colias Boothii*, Curtis; *Melitæa Helvia*, Sc.; *Melitæa Alma*, Strecker; *Erebia Rossii*, Curtis; *Erebia Sofia*, Curtis; *Chrysophanus Annica*, Edw.; *Pamphila Yuma*, Edw.; *Pamphila Bellus*, Edw.; *P. Horus*, Edw.; *P. Cestus*, Edw.; *P. Arabus*, Edw.; *Nisoniades Tatius*, Edw.; *Erycides Urania*, West. Hew.; and *E. Texana*, Sc.—For specimens of these the writer will give any amount in reason either of gold or pearls, or of specimens in exchange.

The species are represented in most cases by long series of specimens of both sexes, and the collection is rich in aberrations and seasonal forms. In addition to the collection of North American Rhopalocera the writer has obtained from various sources large numbers of the Rhopalocera of other faunal regions. The collection contains fully fifteen hundred species from the Antilles, Central and South America, over four hundred species from Equatorial Africa and the Cape; a full series of the strictly European species and over one thousand species of the Rhopalocera of the Asiatic mainland and the Malay Archipelago. Among the Asiatic species there is a very large and perfect set of the Rhopalocera of Japan, taken by the writer during his stay in that country as the Naturalist of the U. S. Eclipse Expedition of 1887. Species not taken by himself are represented by specimens purchased from the late Henry Pryer of Yokohama, or obtained from other collectors in the Empire of the Rising Sun. Of the species of Rhopalocera credited to the Japanese only three or four are lacking as yet. There are, in the entire collection, very nearly 4,000 species of the Rhopalocera of the world.

In the Heterocera an equally good showing in the number of species is made, but as the number of these vastly exceeds that of Rhopalocera in no case can any faunal region be said to be thoroughly well represented. The collection is tolerable rich in European forms. Of the species enumerated from North America in Grote's Check List about one-half are found in the collection, and when all of the material on hand shall have been correctly worked up and determined the number will no doubt be found to be largely increased. From Jamaica there are nearly 400 species as yet undetermined. There are fully one thousand species of Heterocera from Equatorial Africa in the collection of which only the merest fraction has been determined and no doubt many of the species are as yet non-described. The Japanese fauna is represented by nearly nine hundred species of Heterocera, among them the entire collection of the Hypenidæ, Deltoids and Pyralids of Japan made by Henry Pryer which the writer purchased in October, 1887, from his now lamented friend,—fully 375 species, the majority of them as yet undescribed, a monograph of which he now has in course of preparation.

In addition to these considerable collections there are large numbers of Heterocera from the Indo-Malayan region, derived from various sources, among them all the specimens contained in the collection of the late Dr. Rössler of Stuttgart, Germany.

While not making a study of the Coleoptera and other Orders the writer has incidentally obtained much valuable material, representing them. There are over 2,000 species of the Coleoptera of North America in the collection determined by such eminent authorities as Drs. Leconte, Horn and Hamilton. To the latter especially the writer is under manifold obligations for many kindnesses shown in the determination of species. Jamaica is represented by several hundreds of species of Coleoptera, mostly undetermined. Equatorial Africa is represented by over one thousand species, of which not more than five per cent. are determined. Japan is represented by a nearly equal number of which not more than fifty species are as yet correctly determined. The same remark holds good as to the Indo-Malayan region. The European Coleopterous fauna is represented by about seven hundred species mostly *Carabidæ* and *Cerambycidæ*. The *Buprestidæ* of Australia through a recent purchase are fairly represented.

In addition to collecting the insects the writer has found it necessary, owing to the absence of any great public library in the City of Pittsburgh, to also undertake the collection of works relating to Entomology and has amassed during the past five years the nucleus of a considerable collection containing the Transactions and Proceedings of almost all the Entomological Societies of the world and very nearly all of the leading works published in recent years upon the Lepidoptera.

The foregoing statement is not made in the spirit of vanity or egotism, but as a guide to friends who may be inclined to consult the writer and who is always happy to serve so far as the pressing engagements of a busy professional life allow him. He will cheerfully attend to correspondence as time permits and desires especially to cultivate an acquaintance with collectors in the Southern and Western portions of the United States.

Pittsburgh, Nov. 6, 1888. W. J. HOLLAND.

◆

Chambers' Corrections to his paper on the Illustrations of the Neuration of the wings of American Tineidæ.*

BY WM. BEUTENMÜLLER.

The following corrections were written in pencil by the late V. T. Chambers on the margins of the plates of a copy of the above named paper which he presented to Mr. Henry Edwards, to whom I am indebted for allowing me to make use of these unpublished notes.

Fig. 4.—Hind wing ought to have dotted line through the cell.

Fig. 5.—Omits furcation of apical branch of fore wing.—In the hind wing the submedian is too short and the costal and apical half of the subcostal are omitted.

Fig. 7.—Fore wing ought to have one more median branch.

Fig. 9.—Has one more marginal vein than it ought to have.

Fig. 10.—Hind wing wants one more branch of the subcostal—the 1st branch.

Fig. 13.—Hind wing wants one median branch.

Fig. 21.—Has one median marginal branch too many in the one wing and one too few subcosto-marginal branches, and the hind wing lacks the dotted line through the disc.

Fig. 23.—Has one median marginal vein too many in the fore wing.

Fig. 25.—Hind wing omits dotted line through cell.

Fig. 26.—Fore wing ought to have one more median branch.

Fig. 27.—Fore wing wants one discal branch.

Fig. 29.—Hind wing should have the median vein furcate on the margin.

Fig. 31.—Fore wing omits fold. Hind wing a little too wide.

Fig. 33.—Subcostal wants its branch to the hind margin.

Fig. 36.—Are not confident as to the furcation of the apical veins. Hind wing has one vein too many.

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* Journ. Cin. Soc. Nat. Hist., Vol. II, pp. 194–199. 1880.

Fig. 37.—Hind wing ought to have the first discal branch dotted through the wing.

Fig. 41.—*E. concolorella* does not agree with mounted specimens so labeled (improperly?).

Fig. 42.—Should have the apical branch near to the subcostal and a dotted indistinct median branch in place of the distinct one which should be nearer to the subcostal.

Fig. 43.—Discal branch of wings ought to be furcate.

Fig. 45.—Hind wing instead of five marginal should have four, one of them furcate.

Fig. 54.—Omits furcation of apical branch of fore wings.

Fig. 55.—Should have one more submedian branch in fore wings.

Fig. 56.—Not strictly accurate. Hind wing has the discal branch much too distinct.

Fig. 57.—Fore wings should be caudate and the subcostal ought to be bent down to the median instead of *vice versa.*

◆

Descriptions of some Lepidopterous Larvæ.

By Wm. Beutenmüllfr.

Drepanodes arcuata, Walk.

Head small, pale yellow with two transverse brown bands. Body above, bright green. Along the dorsal region from the 5th to the last segment reddish brown, marked with yellow, and limited on the subdorsal by a deep brown broken stripe which is sometimes quite obsolete and sometimes absent. On each of the 2nd and 3rd segments two prominent yellow tubercles tipped with reddish brown, and at the base at the outer side of each a small black wart. On the 5th segment are also two prominent tubercles which are wanting in some individuals. Anal segment provided with a short brown process covered with short bristles. Body beneath sordid white. Legs green. Over the body are scattered a number of small yellow piliferous spots each bearing a short white hair. Length about 23 mm.

Foot plant, White Birch (*Betula alba*). Lives singly on the upper surface of leaf on a white silken web slightly drawing the leaf together. Spins a thin cocoon between leaves. September.

Agrotis pitychrous, Gr.

Head shiny, pale brown, mouth parts pitchy black. Body sordid white, semitranslucent, with three equidistant chalky white stripes along each side, and one along the dorsum. Spiracles black. Cervical shield dirty white. Body below wholly sordid white, semitranslucent. Legs concolorous to the body. Length 36 mm.

Feeds on various species of maritime grasses. July.

Phycis rubrifasciella, Pack.

Head chestnut brown, mouth parts pitchy black. Body above dirty green with two rows of minute black piliferous spots on each side, and all bearing a short light brown hair. Spiracles black. Underside of body same color as above. Length, 16 mm.

Lives singly in a pyriform case made of frass between the terminal leaves of the branches of *Myrica cerifera.*

Phoxopteris spireæfoliana, Cl.

Head small, yellowish green, with small black spot on each side of the anterior portion, mouth parts pitchy black. Body yellowish green with two rows of piliferous spots of the same color along the dorsal region, and two rows on each side. Underside same color as above. Length, 10 mm.

Food plant, *Spiraæ opulifolia* (Nine Bark). Draws together the leaf between two veins so as to produce a fold. Double brooded. June and Sept. Hibernates in a cocoon between leaves.

◆

The habits of Goes and Oncideres.

By M. L. Linell.

On the Palisades near New York *Goes pulchra,* Hald., was taken by me last season under circumstances that were strikingly suggestive of the habits of *Oncideres cingulata,* Say, on Carya sp. with large buds, the same that are preferred by the *Oncideres,* I saw *Goes* at work on the twigs, cutting through the bark nearly all around (and a little deeper in some places), but very irregularly, not making a clean ring. It impressed me that this must be done on purpose to kill the twig, with the intention of ovipositing on it, a well-known fact in regard to the girdler. The male was generally seen gnawing on the endbud of the same twig that the female was girdling, just as we so often see the pair of *Oncideres* together. When we take into account the wonderful resemblance in color and form between these two, though systematically widely separated species, the likeness is still more remarkable though the *Goes* is twice the size of the *Oncideres.* I think this is a fine instance of analogy in protective resemblance, similarity in habits having independently wrought their results in leading both to resemble the same thing, the maculation of the Carya twig. Both seem to live in the larval state for two years; in 1884, 1886 and 1888 *Oncideres* was very abundant, while not a single specimen could be found 1885 nor 1887. The species are not found together; the *Goes* appear in the first days of July and are completely gone before the end of that month, while *Oncideres* can not be seen before the last days of August and is abundant throughout September. This occurrance of *Oncideres* so late in the season, when few collectors visit the branches of trees, accounts for its rarity in collections and my success in using it largely for exchange. Only *Cylleus Robiniæ*, Forst., of the *Cerambycidæ* has the same season, but is found on the Golden Rod, as is well known.

Of the other species of *Goes* I have taken *G. debilis*, Lec., about July 1st on Hickory, *G. tigrina*, De Geer, about July 15th on White Oak. The very rare *G. tesselata*, Hald., was found by Mr. A. C. Weeks and myself on Staten Island, in July, 1885. We took it by beating over the umbrella the dense 10 inch long shoots on freshly cut Oak-stumps. Only one pair and three single females were secured.

◆

A New Spilosoma.

By Annie Trumbull Slosson.

Spilosoma prima, n. sp.

Size of *S. virginica*, but a stouter insect, body heavier and shorter, scarcely reaching anal angle of secondaries. Primaries sordid white, stained with ochreous, especially along costa and inner margin, and with scattered dots of dark brown. These are arranged almost exactly as in some specimens of the form of *H. textor*, Harris, known as *cunea* and *punctata*. The dots are much heavier and more distinct on costa, and there is a submarginal line, very plainly indicated, and composed of geminate dots on the venules. Secondaries sordid white. Abdomen thickly clothed with white hairs through which can be seen the yellow of body, with dorsal row of black spots. Palpi, coxæ and tibiæ very dark smoky brown, almost black.

Though this description may seem to differ little from those of other species, the moth itself seems quite distinct. Its peculiar ochreous shading—which makes the insect seem cream-color, almost buff, instead of white—the heavy, stout look, and, above all, the very dark smoky color of coxæ and tibiæ, differing so markedly from the light orange tints in *S. virginica*, *congrua* and *antigone*, give it an appearance quite unlike its nearest kin. Described from 5 ♂♂, 1 ♀, taken at light in Franconia, N. H., early last June.

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Books and Pamphlets received during December, 1888.

Prairie Farmer, December, 1888.
Psyche, Vol. V, Nos. 151 and 152.
Synop. of Families and Genera of N. Amer. Diptera, by Prof. S. W. Williston.
Canadian Naturalist, Vol. XX, No. 12.
Fourth Report on Injurious Insects, by Prof. Lintner, N. Y. State Entomologist.
Bulletin, Nos. 5 and 6, N. Y. State Museum of Nat. History.
Le Naturaliste Canadienne, Vol. XVIII, Nos. 5 and 6.
Naturae novitates, Nos. 22, 23 and 24.
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ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, MARCH, 1889. NO. 3.

The EPIPASCHIINÆ of North America.

By Geo. D. Hulst.

The *Epipaschiinæ* are a group of moths of comparatively few species, but of very wide distribution. A number of species have been described from the United States, several, (and the number is likely to be considerably increased), from South America, a number from Australia and New Zealand, and a number more from Hindoostan, altogether about 40 species.

The group though small and widely distributed, is nevertheless one of very great interest.

The *Epipaschiinæ* are separated from the Macrolepidoptera by the presence of three internal veins on hind wings; from the *Tortricidæ* and *Tineidæ* in that none of these internal veins are furcate at the base. From the most of the *Tortricidæ* and *Tineidæ*, as well as from the *Phycitidæ* and *Crambidæ*, in that the lower median vein of the hind wing has no hair pectination; from the rest of the *Pyralidæ* as well as from all others, by the presence of a membraneous process extending from the basal member of the antennæ backwards, sometimes reaching to the abdomen.

But while thus having their own peculiarities which separate them from all others, the *Epipaschiinæ* differ widely, almost radically, among themselves. The differences in palpi, maxillary palpi, antennæ, antennal process, ocelli, venation, wing vestiture, and armature of the legs are very remarkable. Among the species is at least one with palpi short and porrect, while others have the palpi long, erect, or curved over the head and extended over the thorax like *Acrolophus*. Among the species are some in which the maxillary palpi are invisible, in others these organs are very prominent. In some the maxillary palpi are single and scaled, in others bilobed at the end, and furnished with long pencils of hair. Among the species are some with the antennæ of the male very strongly pectinated, in others there are tufted-pubescent. In some, the antennal process is long, covered with long hairs and scales, in others the process is hardly indicated. In some, there are 12 veins in the fore wings, in others 11; in some, the male and female agree in venation, in others they are very widely different. In some the fore wings of the male have a costal fold and a vitreous spot beneath, others have neither. Sometimes vein 1 of the fore wings is furcate at base, sometimes it is not so. Some have the cell of the hind wing very short, others of the usual length; some species have ocelli, one at least has none. Some have the hind tibiæ with two pairs of spurs, one has the end pair only. Some have the tarsi spinulated the whole length, others have them weakly spined at the end. Some have both wings tufted, some the fore wings only. In some the male uncus is hooked, sharp, slender, forked at base, in one species at least, obtuse, scutelliform. Altogether the subfamily covering about two score species gives a pretty wide range of variation, which makes the family a rather difficult one to limit, except by the presence of the unique antennal process.

The first American species known were described by Prof. Zeller in Isis, 1848, and for the two species named by him he erected the genus *Tetralopha*. Afterwards species were described by Clemens, Zeller, Grote, and myself. Mr. Grote first attempted a systematic synopsis of the species, and in the Bulletin of the U. S. Geological Survey, Vol. IV, gave the name *Epipaschiæ* to the group, determined new genera, and gave figures of venation of the genera, which, corrected, were published in the N. A. Entomologist. Mr. Meyrick has given a synopsis of the species of Australia and New Zealand, and described in that synopsis a number of genera.

Those who have endeavored to classify the insects have seemed to differ quite widely as to their affinities, and as a consequence have catalogued them in widely separated positions. Guenée places his genus *Glossina* in the *Pyralidinæ* between *Aglossa* and *Asopia*. But Guenée knew the female only. Lederer keeps the genus in the same place calling it *Stericta*, as *Glossina* was preoccupied, but says he does not know the insects described by Guenée. He, however, has one other species of the *Epipaschiinæ* and describing it as *Deuterolyta conspicualis* places it near and above *Botis*, undoubtedly looking upon it as belonging to the *Pyralidinæ*. Mr. Meyrick in his works upon the Microlepidoptera of New Zealand and Australia, discusses the group, calling it "*Epipaschiadæ*," and concludes it should be catalogued at the head of the

Pyralidæ. Lord Walsingham, in describing the very peculiar species *Cœnodomus hockingi*, says that Mr. F. Moore suggested to him that the genus was allied to the European genus *Aglossa* and that he agrees with him. So far every systematist dealing with Australian and East Indian material places the group in the neighborhood of *Aglossa*, and generally all agree that it is very closely akin to that genus.

But on the other hand Prof. Zeller regarded *Tetralopha* as a Phycitid. Clemens placed *Epipaschia* among the Deltoids by mistake, but put the other species he describes under the heading "*Phycites.*" Mr. Grote separates the species from the "*Phycidæ*," but places them just before that subfamily, while remarking they have certain affinities to the *Galleriidæ.* These all agree that the *Epipaschiinæ* find their nearest allies in *Phycitidæ.*

The determinations seem to have been made as the writers had or had not possession of the American, especially the 11-veined species. Without these species the affinities have seemed to be mostly with the *Pyralidinæ.* With these, it seems, the systematists could not remove the the group from the *Phycitidæ.*

We are not in possession of the East Indian or Australian species, and so are unable to make any statements based upon personal examination of them. But with the descriptions of Mr. Meyrick and Lord Walsingham, and having in our possession probably all the American species, we have, we think, a solution of the systematic difficulty.

Mr. Meyrick, in a paper upon the Classification of Australian *Pyralidina*, (Trans. Ent. Soc. Lond., Dec. 1885, p. 421), says, "I think the *Pycididæ* may be regarded as a development of the *Galleriidæ*"; and again further on, "The *Pyralididæ* and *Epipaschiadæ* are referable to a common ancestor very little removed, and the same can be said of the *Scoparidæ* and *Crambidæ*: whilst the *Galleriidæ* come from somewhere between these two presumptive ancestors."

Personally, we fail to see any evidence of a possible development of the *Phycitidæ* from the *Galleriidæ.* The peculiarities of the *Phycitidæ* in venation, wing shape, maxillary palpi, labial palpi and antennal structure have no indications in the *Galleriidæ*; but in all these we have kindred, if not identical developments in the *Epipaschiinæ.* At the same time there is in many respects a likeness to the *Pyralidinæ*, so that we would connect the *Phycitidæ* with the *Pyralidinæ* through the *Epipaschinæ*; or perhaps the latter is the ancestral and now nearly obsolete stem, from which in different directions the other two have arisen. The species which the old world furnishes, show a marked relationship to the higher Pyralids, but the American species show even more decided leanings to the *Phycitidæ*, so decided indeed that one is almost forced into joining them as somewhat aberrant members of the same subfamily. Taking the 11-veined American species, almost every peculiarity possessed by them is found among the *Phycitidæ*, and even in the antennal process there is an insensible intergradation into what is found in the *Phycitidæ*.

It is highly probable that too much importance has been given to the possession by these insects of this peculiar antennal process. One ought to be cautious in giving even generic weight to a secondary sexual character, but when there is a gradation from a strong development into the entire lack of the character, relationships should be sought for on other grounds, and if possible in those which like the antennal process are more or less peculiar, viz: the pencil-tufted maxillary palpi, the bitufted antennæ, the erect recurved palpi, the cross ridges of scales on wings, the costal fold beneath the fore wings, and the genital armature. Taking all these characteristics we feel certain our American species are very nearly related to the *Phycitidæ* and that they connect these with the *Pyralidinæ* though much closer to the former than the latter.

The points of affinity to the *Phycitidæ* are not a few and even in their widest differences the two groups are strongly correllated.

In the palpi, antennæ, clypeus, ocelli, pencillate maxillary palpi, venation, costal fold, viteous spot, scale ridges and general construction of the genitalia the *Epipaschinæ* agree with certain of the *Phycitidæ*, or, what amounts to quite as much, they do not agree with each other.

The points of difference are as follows: 1st, the bilobed maxillary palpi; 2nd, the antennal process; 3rd, the basal tuft on underside of fore wings on inner margin; 4th, the frenulum, single in ♂, double in ♀; 5th, the hair pectination of the lower median vein of the hind wings. In all these the *Epipaschiinæ* are distinct from the *Phycitidæ*.

In most of these very peculiarities of the *Epipaschiinae* however, there is an approach to the *Phycitidae*, or the tendency is found among the *Phycitidae*. The bilobed maxillary palpi we speak of as a difference though it is by no means such. It is rather one of the most convincing proofs of close relationship to the *Phycitidae*; for this peculiarity, otherwise so far as we know unique, is possessed by some of the *Phycitidae*. The bilobing is a modification of the two ultimate members in which the last is set not on the end but on the side of the one below, and generally near its base, so that in some instances the two members seem to be almost set together on the summit of the antepenultimate member. Among the *Epipaschiinae* there is some variation, for in *Oneida lunulalis* the end member is above the middle of the one on which it is placed. Among the *Phycitidae* in all cases of the hair pencilling of the maxillary palpi examined by us, both the end members are pencilled, and there is in some cases the existing of the bilobing. In *Rhodophaea advenella* the last member is not on the end of the one below. In *Dioryctria mendacella* and *Pempelia ornatella* the bilobing is distinct, the end member being set nearly at the base of the one below it. In *Pempelia ornatella* as in others of the pencil-tufted species where the bilobing does not exist, the antepenultimate member is long, filiform, just as it is found in some of the *Epipaschiinae* and the counterpart of its appearance in *Oneida lunulalis.*

The antennal process is not possessed by any Phycitid, yet *Etiella* has a more marked basal antennal protuberance than has *Attacapa callipeplella.* Indeed, if the antennal process be insisted upon as a subfamily characteristic, *Etiella* must be catalogued with the *Epipaschiinae.*

The frenulum is a secondary sexual character, though one we consider of very great value, and so far as we have observed, no Phycitid has the frenulum double in the ♀, as is the case with all *Epipaschiinae.*

The pectination of the lower median vein of the hind wings separates them so far as we are aware from all *Phycitidae.* But to make this peculiarity a basis of subfamily separation seems to us to be giving it an unwarranted importance. Mr. Meyrick (Trans. N. Zealand Inst., Vol. XVII, 69, 1884), places in the *Scopariinae* two genera and in the *Botidinae* one genus, (Trans. Ent. Soc. Lond., Oct. 1884, pp. 293 and 328), in which the lower median is pectinated. This peculiarity is not made a necessary basis of separation in the *Tortricidae*, for in spite of it, in view of other characteristics, Prof. Fernald and Mr. Meyrick place those with and without this distinction in the same subfamily when they agree in the possession of the developed genital uncus, (Trans. N. Zealand Inst., Vol. XVII. 141, 1884).

We can not, of course, make linear catalogues, but from what has been said we think in American catalogues the *Epipaschiinae* and *Phycitidae* must go together, and that they cannot, without violence, be separated.

In our study of the North American species we have found some novel and to us unique characteristics, to which reference has already been made. These we will now review more in detail.

PALPI.

In these species the most remarkable characteristics are the length of this organ, and the length and position of the end member. In all cases the palpi are long, and when erect, exceed the head. The 2nd member is comparatively long, in some cases very long, and is always heavily scaled, more especially in the male. The end member is comparatively short, sometimes exeedingly short; it is variable in shape, sometimes oval linear, sometimes conical. It is generally set on the end of the second member, but in some cases in front, and in one species does not reach as high as the summit of the second member.

MAXILLARY PALPI.

These show a remarkable, and, if we except some *Phycitidae*, a unique characteristic. The maxillary palpi are present in all species we have examined, though in the synopsis hereafter given we speak of them as being *invisible* in some species. They are in these entirely beyond observation except under the most careful preparation of the head parts, and then only under a power of at least 20 to 30 diameters. But in all cases the characteristic is the same. The end member is not on the summit of the member next below, but is set upon it nearly at its base, sometimes seeming to be directly from the same stem. All systematists have noticed the bi-tufted maxillary palpi, but none seem to have noticed that it was accompanied with a remarkable modification of the organ itself.

EYES.

The eyes are surrounded with a fringing of short hairs.

ANTENNÆ.

The antennæ are in no respects strongly peculiar, except in the presence of the basal membraneous process. They are doubly bitufted pubescent on the basal and middle segments, and simply pubescent towards the end. In one species each segment, basally and medianly, seems to be doubly tritufted. The tuftings are on the posterior side, and are shorter in the female. In all cases the antennæ are scaled in front.

The process is subject to great variation in shape, as will be seen from the figures.

THORAX and ABDOMEN.

There is, so far as we have noticed, no peculiarity about the thorax or abdomen, except in one species; in that the abdomen is tufted laterally on the penultimate and antipenultimate members much after the manner of *Samea*, Guen. The genitalia differ in some respects in the direction of the furcate basal part of the uncus, and in the lateral spines.

WINGS.

There are some remarkable peculiarities in the wings. In some of the species the wings are simple and correspond in both sexes. In others there are modifications of a sexual character which, taken as a whole, are extraordinary, and, so far as we are aware, unique. In the females the wings are simple, and follow the normal structure. In the males there is a costal fold of long scales ranged transversely beneath the wing, and under this, more or less concealed, a vitrifying of the discal space. This vitrifaction essentially modifies the venation; the cross vein on the outer margin of the discal cell is lost from its place, and vein 6 continues almost to the base, to which place the outer discal vein seems to be forced. The vitrifaction is both sides vein 6, and this is pushed out by the spaces in waves back and forth. The costal and subcostal veins are strongly modified, being driven together, and having the appearance of anastomosing. The costal space is broadened basally. The lower median is extraordinarily broadened, especially at and beyond the union with vein 2, where it is swollen and seems to be filled with a liquid in color and appearance much like that which exudes from the wings when punctured during expansion. We are confident the insect can at will expand the tuftings of the maxillary palpi, and can project forward the costal scale fold, and expose the vitreous space, and can thus with its bitufted antennæ and movable scaled process added, far beyond the ordinary ability of the Lepidoptera, flaunt its beauty peacock-like before its mate for the sake of gaining her admiration and becoming her choice in love.

Another peculiarity of the wings is a patch of short stiff hairs at the base of the fore wings between vein 1 and the inner margin.

Still another peculiarity is the frenulum which is single in the male, divided in the female.

Vein 1 is sometimes furcate near the base, sometimes not, in the same species. No reliance can be placed upon this peculiarity for generic determination. This is the only point of structure which gives any suggestion of relationship to the *Galleriidae.*

In a few instances we have found veins 4 and 5 of the fore wings, after separation from the angle, joined again, forming a cell. This is, however, a characteristic not permanent to the species.

Still another very extraordinary characteristic is the existence in some species of 11 veins only in the fore wings of the ♂, while the ♀ has 12. From very careful observations upon finely prepared specimens, we are of the opinion that this is due to the coalescing of 10 and 11 through the modification caused by the vitrified space. In the 11-veined females, the same thing has happened from other causes. With Mr. Meyrick we agree that no vein is ordinarily lost, save by coalescing with another, the point of furcation being moved beyond the edge of the wing.

Still another peculiarity is the strong tendency to iridescence on the posterior portion of the fore wings beneath. It is ordinarily apparent as a mother of pearl luster, but under a strong glass with very strong light it shows out with a splendor we have rarely or never seen surpassed.

LEGS.

The legs are generally very squammosely clothed. The tarsi only are spinulated, in some cases the hind tarsi only, but the tarsal hairs so nearly appear like spines that it is difficult to tell the difference save in carefully prepared specimens and under a strong magnifying power. In all cases the spinulation is most decided on the hind tarsi. In the other tarsi it is sometimes altogether wanting. The middle tibiæ are armed as is usual, the spurs being strong, the outer one generally much the longer. In a single instance the hind tibiæ have the end pair of spurs only, a variation so remarkable in so small a family that we assert it only after careful and repeated observation.

The feet are 2-clawed, the claws sharp, rounded, sickle-shaped, with an angular projection at the middle of the concave side. The foot itself between the bases of the claws is furnished with a prominent projecting pad, an organ which we have not hitherto observed in the Lepidoptera. From the base of the claws above a number of long slender spines project, curved somewhat inwardly about the foot.

The following synopsis, as well as what has been said above, is based upon the species of North America only.

EPIPASCHIINÆ, Wals.

Epipaschiae, Grote, Geol. Surv. Terr. Bull. 4, p. 685, 1878; N. A. Ento. I, 7, 1879; *Epipaschiadae*, Meyrick, Trans. Ento. Soc. Lond. April, 1884, 62; Trans. Ento. Soc. Lond., Sept., 1887, 187; *Epipaschiinae*, Walsingham, Trans. Linn. Soc. Lond. V, pt. 2, 47, 1888.

Head:

Palpi, erect or recurved, long or very long, heavily scaled; 2nd member long, 3rd short or very short.

Maxillary palpi, bilobed at end, often strongly developed and pencil tufted in ♂, smaller and not pencil tufted in ♀; sometimes invisible in both sexes.

Eyes, globular, protruding, fringed, rather widely separated.

Ocelli, present, distinct.

Clypeus, flat or slightly rounded, broad, without hair tuft.

Antennae, in front scaled, behind double tri- or bitufted pubescent except near end, there pubescent; from basal member posteriorly, a membraneous scaled process.

Tongue, strong, long, scaled in front near base, divisions strongly marked.

Thorax, broad, generally heavy, patagiæ long scaled, a tuft of long scales beneath at base of fore wings.

Wings.

Fore wings, broad, costa straight or somewhat arched, apex never sharp, sometimes obtuse rounded; outer margin rounded, inner margin rounded, generally slightly sinuate. Above, the most of the species have 2 crossbands of larger scales, which in places rise up into tuftings; two cross lines limiting the basal and middle fields. Beneath, both sexes with the usual hair tuft receptacle in which the frenulum is hooked; a tuft or patch of coarse, not very long, hairs at the base of the wing between vein 1 and the inner margin. In some of the species, in the males, a costal fold of coarse transverse scales extending from base sometimes $^2/_3$ the length of costa. Beneath this and partially or altogether hidden a vitreous spot.

Hind wings, broad, nearly unicolorous, with rather indistinct anterior angle and rounded anal angle.

Venation.

Fore wings, 12- or 11-veined, venation very variable, but 7, 8 and 9 always stemmed, 3 always separate. A peculiar feature is in the abnormal venation of those males which have the costal fold and vitreous spot on the fore wings; the ordinary plan of venation is essentially modified, the outer discal limitation being lost and the lower median being greatly widened and swollen.

Hind wings, with 3 internal veins, and 8 veins in all, counting after the method of most of the great systematists and the method now almost universally adopted; cell short and closed, 8 reaches the base, being joined with 7 by a short cross vein beyond the cell. Subcostal present, distinct near anterior angle, but becoming obsolete always before reaching base. Otherwise the venation is variable.

Frenulum, single in ♂, double in ♀.

Abdomen, cylindric, not tufted, with one exception.

Genitalia. Uncus prominent, slender, bent, furcate at base; inferior lobe somewhat ladle-shaped, fringed on upper posterior margin with stiff inwardly directed hairs; side lobes rather prominent with long hairs turned inwardly and sometimes with stout incurving spine at base.

Legs, rather short, stout, generally loosely scaled, tarsi generally spinulated, claw sharp, sickle-shaped.

Fore legs. Coxæ broad, flattened, oval, broadest at base; femora flattened, stout; tibiæ short, about $^1/_2$ femora, tibial epiphysis near middle and less than $^1/_2$ tibiæ in length. 1st tarsus as long as tibia, and about as long as the rest together; femora sometimes tufted on end.

Middle legs. Coxæ, femora and tibiæ flattened-cylindrical, the tibiæ enlarged at lower end; tibiæ with a pair of spurs at end; tibiæ a little shorter than femora; 1st tarsus nearly as long as the rest together.

Hind legs. Femora and tibiæ cylindric, not incrassated; tibiæ with end pair of spurs, and generally with middle pair also; femora $^{2}/_{3}$ the length of tibiæ; tibiæ somewhat tufted at summit; 1st tarsus nearly as long as the rest together.

Larvæ as far as known cylindric, with small hair tufted tubercles on each segment; head rounded; legs 16. They live concealed in folded leaves, held thus by fastenings of silk, and sometimes in tubes of silk and frass within these. They pupate in a close cocoon on the surface of the ground. Some of the species are double brooded, and some at least remain in the cocoon unchanged as larvæ till the following Spring.

SYNOPSIS OF GENERA.

1 Fore wings of ♂ simple, 12-veined in both sexes .... 2.
Fore wings of ♂ with costal fold and vitreous spot beneath .... 6.
2 Maxillary palpi present .... 3.
Maxillary palpi invisible .... **Oneida.**
3 Hind tibiæ with 2 pair of spurs .... 4.
Hind tibiæ with end pair of spurs only .... **Yuma.**
4 Maxillary palpi scaled in ♂ .... **Epipaschia.**
Maxillary palpi pencil tufted in ♂ .... 5.
5 Process long .... **Cacozelia.**
Process short .... **Stericta.**
6 Fore wings 11-veined in ♂, 12-veined in ♀ .... 7.
Fore wings 11-veined in both sexes .... 8.
7 Fore wings, 10 and 11 separate; 6 stemmed with 7. 8 and 9 in ♀; palpi erect, not recurved over head; 3rd member on end of 2nd member and comparatively very long .... **Lanthaphe.**
Fore wings, 10 and 11 stemmed, 6 separate; palpi long, re-curved over thorax, Acrolophus like; 3rd member very short, set in front of the 2nd member .. **Saluda.**
8 Maxillary palpi present; antennal process more or less developed .... 9.
Maxillary palpi invisible; process hardly indicated .... **Attacapa.**
9 Fore wings 6, 7, 8 and 9 stemmed in ♀ .... **Tioga.**
Fore wings 6 separate in ♀ .... **Tetralopha.**

EPIPASCHIA, Clem.

(*Epi*, upon, and *paschein*, to be impressed.)

Clemens, Proc. Nat. Sci. Phila., Jan. 1860, p. 14; Grote, Proc. Bost. Soc. N. Hist., Vol. XIX. p. 262, 1877; Geol. Surv. Terr. Bull., IV, 685, 1878; N. A. Ento. I, 9 1879; Meyrick, Trans. Ento. Soc. Lond., April 1884, 62, Trans. Ento. Soc. Lond., Sept. 1887, 187.

Deuterolyta, Led., Wien. Monats., VII, 358, 1863; Grote, Buff. Bull., II, 77, 1873; Meyrick, Trans. Ento. Soc. Lond., Sept. 1887, 187.

Mochlocera, Grote, Can. Ent., VIII, p. 151, 1876; Geol. Surv. Terr. Bull., IV, 686, N. A. Ent. I, 9, pl. 2, f. 2; Meyrick, Trans. Ento. Soc. Lond., Sept. 1887. 187.

Calamola, Meyr , Trans. Ent. Soc. Lond., April, 1884, 63; l. c. Sept. 1887, 187, l. c. Oct. 1884, 280.

Astropometis, Meyr., l c. April 1884, 67; l. c. Sept. 1887, 187.

Palpi erect, reaching above head, heavily scaled, end member short, less than $1/4$ the length of the second, maxillary palpi scaled; antennal process strong, long, reaching back over thorax, with long hairs and scales, except basally and above where the scales are short and closely laid; thorax stout; fore wings 12-veined, 1 often furcate, 4 and 5 stemmed or separate, 6 separate, 7, 8 and 9 stemmed, 10, 11 and 12 separate; above with cross ridges of scales running into tuftings, simple beneath; hind wings 8-veined, 3 separate, 4 and 5 separate or stemmed, 7 and 8 separate or stemmed; cell very short.

Genitalia, normal.

I did not know of Mr. Meyrick's work upon the *Epipaschiinae* until after I had published the article in Ento. Am., Vol. III, pp. 113—118. I have since then examined quite a number of specimens of American species, and incline to agree with Mr. Meyrick's final determination that differences of venation which elsewhere would be a reliable basis of division cannot be relied upon in this subfamily. As a consequence, several genera which would be valid under ordinary circumstances, must be combined.

There can, we think, be no doubt of the identity of *Denterolyta* with *Epipaschia*. Mr. Grote says (Buff. Bull. I, 177, 1873) that he sent a specimen of his *D. borealis*, to Prof. Zeller and he, on Lederer's authority, identified it as Lederer's species; but *D. borealis*, Grote, is *Epipaschia superatalis*, Clem.

SYNOPSIS OF SPECIES.

Fore wings olive or ochre yellow, hind wings light fuscous............**superatalis.**

Basal field blackish, hind wings dark fuscous ....**zelleri.**

E. superatalis, Clemens. Proc. Acad. Nat. Sci., Phila., 1860, p. 14; Grote (*Epipaschia*), Proc. Bost. Soc. N. Hist., XIX, 262, 1877; Geol. Surv. Terr. Bull., IV, p. 686, 1878, N. A. Ent., I, 9, pl. I, f. 1, 1879.

Conspicualis, Led. (*Deuterolyta*), Wiener Monats., VII, 360, pl. VII, f. 16, 17, 1863; Grote, Buff. Bull., I, 177, 1873.

Borealis, Grote. (*Deuterolyta*), Buff. Bull, I. 177. 1873. II, 77, 1874, Proc. Bost. Soc. N. Hist, XIX, 262, 1877.

Olivalis, Hulst, (*Tetralopha*), Trans. Am. Ent. Soc., XIII, 160, 1886.

Palpi rather slender, erect, considerably exceeding head; end member rather prominent, somewhat inclined forward; maxillary palpi quite long, a little ascending, thrust forward between the palpi; palpi. maxillary palpi, front and base of antennæ and process ocher or olive yellow. Ocelli distinct. Process long, reaching nearly to abdomen, closely scaled above, long haired below, except at end where the hairs become long scales. Antennæ double bitufted-pubescent, more marked in male than female. Fore wings dusty ocher or olive yellowish, gray with powdery black lines. Inner middle line marked on costa by a black dot; below it is obsolete, or partially indicated. A black discal dot near the costal spot of the inner line. Outer line irregularly denticulate, better marked superiorly, where it runs obliquely outward to median nervules, produced about vein 4, thence running inwardly below vein 3, whence it descends, very slightly outwardly projected, to internal margin. Terminal field wide; a diffuse, broad, brownish or blackish shade-band marking the veins. A terminal series of distinct interspaceal black marks becoming continuous inferiorly. Fringes pale, interrupted with brown and with a dotted line. Hind wings fuscous, the veins darker marked; a discal dot very near the base and costal border; a terminal distinct line; fringes pale, with a dotted brown line. Beneath yellowish-gray, sometimes suffused with blackish; a common line and discal dots; the terminal shade on fore wings less prominent than above, and here also continued on secondaries.

Venation.—Vein 1 of the primaries is almost always furcate near the base, the furcation being sometimes merely a notch and sometimes extending as a vein to base. 4 and 5 generally join at base or are separate. On secondaries 7 and 8 are separate.

The insect seems to be very widely distributed. It is taken in the U. S., east of the Rocky Mountains, and Lederer's specimens came from Brazil. I have found the larva on *Rhus toxicodendron* and *Rhus glabra.* It is tortriciform, marked on the segments with black dots. It folds over the leaf or joins together the leaflets, and lives within the habitation thus formed. It is almost without doubt 2-brooded.

E. zelleri, Grote, (*Mochlocera*), Can. Ent., VIII, 157, 1876, Proc. Bost. Soc. N. Hist., XIX, p. 264, 1877; Geol. Surv. Terr. Bull., IV, 686, 1878, N. A. Ent., I, pl. 2, f. 2, 1879.

Palpi heavy, erect, reaching above head, heavily ridge-scaled in front and thus flattened in appearance. 3rd member rather fine, distinct; maxillary palpi as in *superatalis*, not quite so prominent. Palpi, maxillary palpi and head blackish gray. Antennæ strongly double bitufted in ♂—slightly so in ♀. Antennal process long, reaching nearly to abdomen, closely scaled above, heavily clothed with long scales and hairs below and at the end. Male antennal process as long as the thorax, or nearly so. Male maxillary palpi scaled. Labial palpi a little exceeding the front, curved upward, with the third joint shorter and more distinct than in *Epipaschia.* Fore wings divided into three fields by the median lines. Inner line defining outwardly the blackish basal space. The line itself is black, with a slight median notch, perpendicular. Median space washed anteriorly with white. A short, black, discal streak. Outer black line very finely denticulate, shaped much as in *superatalis*, but not produced so much on median nervules. It arises at about apical third, at first outwardly oblique, then running inwardly below median vein and narrowing the median space thence to internal margin. Terminally the wing is again black or blackish. A broken black line at the margin. Fringes on both wings dark, pale at base, with broken blackish interline. Beneath blackish, with common shade-band and black discal point on hind wings.

Venation.—Vein 1 of primaries is very rarely furcate at base, 4 and 5 are always separate at base. On secondaries 4 and 5 are joined at base.

Tex., N. Mex., Mo., probably everywhere West of the Mississippi to the Rocky Mountains and North to Nebraska and Iowa.

[TO BE CONTINUED.]

Notes on Rearing Lepidoptera.*

By R. F. Pearsall.

So little has been done as yet in rearing Lepidoptera, that no one method can be classed as superior to others, nor will any insure success. This is dependent upon the care and diligence of those who make the attempt. In my experience I have endeavored to re-produce as nearly as possible the conditions which surround the various larvæ in nature. How best this can be done is a constant study to a mind fertile in expedients, for these conditions include degrees of heat, moisture, space, light, condition of food-plant, and proper facilities for pupation, all suited to the various kinds of larvæ. In supplying these one finds that no rule can be applied to a single family, so diverse are their needs. Take that of *Acronyctæ* among the *Noctuidae*. I will recall my experience with *A. ovata.* I had been annoyed at its persistent attempts to cut through the corners of my wooden boxes in constructing its cells of woody particles, when it occured to me that a piece of dead-wood might be preferred by it, and thus save my boxes from destruction. I placed a piece eight inches long, and perhaps three inches in diameter in the box, and all my larvæ disappeared mysteriously except two. However, in due course, my stick of wood gave out some fifty perfectly developed imagos, and this without being disturbed to outward appearance. It is a mistake to suppose that a supply of fresh air is essential to the health of larvæ. Cleanliness and freedom from mould is of first importance. Next in order is the condition of food-plant. While it is possible in some cases to transfer larvæ from one food-plant to another of kindred family with success, it can be done more easily just previous to, or during the period of moult. Some species, however, prefer starvation rather than taste other than their own particular plant. *Sumach* is not *Sumach* to *Datana perspicua,* unless it be the broad-leaved variety.

The selection of food plant, too, is an important matter. When you have taken your larva feeding in the open woods, on leaves tossed in every breeze, and mellowed into a richness and texture that only sun can give, don't go to the shady border of that wood and gather them, thin, sour, and perfect as a maiden of fifty. They will prove as disastrous to your larvæ as green apples to the school boy. I have found also that heat during larval existance is an important factor in determining the duration of pupal life. Species, ordinarily single-brooded, may be persuaded to go through these transformations at once, instead of going over the winter. I tried it, and was successful in the case of *Edema Albifrons,* bringing out some eighty specimens, while my friend

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* Read before the Soc., Jan. 8, 1889.

Mr. Elliott was equally successful with *Datana perspicua.* Specimens thus produced are, I have found, less liable to grease than others. So it is with specimens of the first brood in all species producing more than one brood in a season.

While a certain amount of space dependent upon the larvæ collected is desirable for some species, it is also a fact that others do better if confined in close quarters. I refer particularly to various *Cochlidiæ*, *Ceruræ*, and *Notodontæ.* In the case of one variety of the latter I found it impossible to bring them through until I confined them in a close tin box two or three together almost air-tight, and in this way they reached maturity without trouble.

Many species feed only at night, and these may be hastened in their growth by being kept in a dark box. Thus it will be seen that only experience and careful observation of the habits of larvæ, coupled with that great essential of all, cleanliness, will produce satisfactory results in the rearing of Lepidoptera. If the larvæ are not properly tended, your pupæ will produce imperfect, weakly specimens.

The treatment of pupæ is a matter of experiment to most of us. Many species remain as larvæ within their pupal shells until the Spring, and these require special care both as to moisture and temperature. I have found it possible by a constant and careful application of heat to produce Winter specimens from many pupæ, but unless great care is exercised not to hasten them too much, your imagos will be but thinly covered with scales, and their colors faded.

I feel that my subject has been but barely touched upon as yet. Many things I would like to present on the habits of larvæ so full of interest, their diseases and enemies. The *Coelodasys* group which feed in the margin of leaves so nearly resembling by their jagged outlines and colors, and the actual shape of the leaf, as readily to escape attention are especially of interest.

The *Catocolæ* too stretched at length along the dead twigs or hidden in the interstices of the bark, which when touched fling themselves into the air for many feet with a faith as to the result, that might inspire more of us with courage. It is a remarkable fact that at various periods of their lives, larvæ seem to require food other than vegetable. I refer to their habit of eating the shells of their eggs when first hatched, and their cast off skin at each successive moult. It has been supposed that this was done as a matter of protection, in order that their enemies might not be aware of their presence by it, but I have found that it has a much more important place than this in their economy, for if deprived of this stimulent to their appetites, in most cases they refuse food and die, particularly in the early stages of their growth.

These and many more I might mention, are worthy of study.

Preparatory Stages of Dasylophia anguina, *Sm. Abb.*

By Harrison G. Dyar.
Rhinebeck, N. Y.

Egg.—Evenly rounded, flattened above and below, smooth. Color reddish, deepening in shade above; diameter about .7 mm.

Newly hatched larva.—Of a yellowish color, streaked irregularly longitudinally with red laterally, and marked with the same color on joints 5, 11 and 12, joint 5 being completely red. Head yellowish, marked with red. Body covered sparsely with black hairs which are much more stout and bristly on top of joints 6, 7 and 8, than on any other part. Length about 3.5 mm. The anal feet are not used in walking.

After 1st moult.—Color greenish with several interrupted lateral brownish lines; on joint 5 two elevated brown spots, and one on joint 12. Head reddish orange; anal feet brown.

After 2nd moult.—Color violet blue with a lateral, and a wide dorsal, bright yellow stripe, edged with black, the dorsal stripe divided by a black line and reaching only to joint 11, being replaced on joint 12 by a black spot; a black spot on each side of joint 5, and a row of larger spots one on each joint above the bases of the legs; last joint marked posteriorly with black; head orange.

After 3rd moult.—Same as in the preceeding stage except that the dorsal stripe is of a more reddish shade.

After 4th moult.—Mature larva: body cylindrical, tapering somewhat to each extremity, the anal feet elevated and not used in walking; head rising above the top of joint 2, of a red color. The body is of a shiny, reddish purple, with seven longitudinal black lines, one dorsal and three on each side, the lateral ones confluent on joint 11 leaving the ground color light blue between them. This color also edges narrowly the dorsal line of each side. Below the lateral lines is a broad yellow band, white in the center, and below this a row of large black spots, one on each segment. Dorsum shaded with reddish and a little yellow just above the lateral black lines. The lines do not extend beyond joint 11, there being a black spot on each side of joint 12 and posteriorly on the last joint. An elevated black spot on top of joint 12, and one on each side of joint 5, the latter interrupting the two upper of the three lateral black lines. Venter with traces of a longitudinal black line. Thoracic feet red; claspers of abdominal feet reddish. Length, about 45 mm.

Pupa.—Enveloped in a thin, but somewhat tough cocoon, composed of silk and bits of earth &c., constructed at the surface of the ground. It is 23 mm. long, 6 mm. in diameter, shining dark chestnut brown; cremaster short and blunt, terminating in several hooklets.

Food plant: Clover.

The duration of each stage was about four days, with the exception of the last which was six days. The eggs hatched August 17th and the larvæ ceased feeding September 6th. They became pupæ in a few days after constructing their cocoons and passed the winter in this stage. There are two broods of this insect in a season, those here described being of the second brood.

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Two Beetles new to the N. A. Fauna.

By Wm. Jülich.

The swift and daily intercourse between Europe and this country has added two more species, only recently observed in this vicinity, to the quite extensive list of imported snout beetles. Four years ago Mr. H. B. Bailey found a number of *Strophosomus Coryli*, Fab., in the Orange Mountains in New Jersey, on the Cherry or Black Birch (*Betula lenta*, L.) and has taken them since then every year on the same clump of trees. They appear about the first of September, and through the month; also a few specimens very early in the Spring, which fact seems to indicate that the beetle hibernates.

The Cherry Birch is very rarely found in this locality, in fact, I have seen only about 6 or 7 trees, besides the above mentioned group, from which I took about 6 specimens of *Strophosomus*, Sept. 9th, last year. The insect is very common in Europe and lives on all kinds of trees, especially Beach and young Hazel, and is not known as doing any damage. In order that it may be recognized I give the following description.

Strophosomus coryli, Fab. S. E., II, 524. Gyllh., Ins., III, 304, 32, and IV, 613, 32.

Black, covered very densely with light gray and brownish scales with metallic lustre. Beak very wide, flat, densely metallic punctured, with fine, distinct groove to base of head, eyes prominent, thorax coarsely not densely punctured with fine groove in middle, sides arcuate; elytra oval, convex, angles rounded, striato-punctate, interstices with erect bristles, especially on sides and apex. Underside covered with dense, light gray scales and densely punctured, antennæ and legs rufous, the latter also covered with scales. Length, .16 to .20 inch. = 4 to 5 mm.

The second species is **Ceutorhynchus cyanipennis**, Illiger. Germar, Ins. sp., I, 235, 363. Gyllh., Ins, IV, 594, 134, 135.

Black, thorax constricted at apex with elevated margin, distinct groove on middle of coarsely and densely punctured disc, small tubercle on each side near base. Elytræ, bright metallic blue, striate, interstices with regular row of punctures. Underside, covered, not densely, with grayish white scales.

Length, .10 inch. = 2.5 mm.

Quite distinct from any of our species by its color. Eight or more specimens taken by Mr. F. H. Chittenden at Ithaca, N. Y., also taken near Baltimore by Dr. Otto Lugger. It is said to be found on grass.

It might be mentioned here that *Cryptorhynchus lapathi*, Fab., hibernates, like our other species of *Cryptorhynchus*, as I found several specimens under bark and chips in November and December last year.

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The Larva of Gnophæla vermiculata, *G. & R.*

By T. D. A. Cockerell.

On the first of June, last year, I found the larvæ of this species feeding on *Mertensia* by Swift Creek, Custer Co., Colo., at about 8,200 ft. alt. From these I obtained moths early in July. I drew up a description of the larvæ and pupæ, which is rather fuller and differs in a few points from that of Mr. Bruce (Ent. Am., IV, 24), so give it here, at the expense of a little repetition, as the early stages in this genus are particularly important as establishing its relation to the Arctiid group. *Mature larva* :—Length, about 30 mm; *head*, bright chestnut, the mouth parts black; *body*, black, with sulphur yellow interrupted bands and steel-blue tubercles; beneath pale green. The dorsal yellow band is the broadest, the subdorsal ones are reduced to the rows of elongated spots, while the lateral bands are cut up so as to produce a somewhat marbled appearance. (Perhaps these are hardly to be called bands, but their homology is such, and so I speak of them.) The blue tubercles are 12 on each segment, in three pairs on each side, those between the dorsal and subdorsal bands being the largest; each tubercle emits some short whitish hairs. *Abdominal legs* blue-black and shiny above and externally, otherwise red-brown; a black point at the base of each. *Cocoon* : a thin white meshwork, with many large holes. *Pupa* : 20 mm. long, head and thorax shiny black, shading off to a dark olive-brown over the wings. Abdominal segments chestnutty brown, marbled with yellowish spots. Each spiracle placed on a large elongated yellow patch, the narrow diameter of which is antero-posterior. Terminal segment blackish, tipped with black bristles. Both in habit and appearance, the larva of *G. vermiculata* reminded me strongly of those of *Callimorpha dominula*, and a similar remark has been made by Lord Walsingham in regard to another species of the genus. I confess, I cannot see the resemblance to the *Acronyctæ* pointed out by Mr. Bruce, except in a most distant way. There is a rather smaller and different form of *Gnophæla* found in Chaffee Co. in August: I fancied it might be distinct, but one sent to the Smithsonian Institute is named *G. vermiculata*.

To Free Breeding Cages from Disease Germs.

By Geo. D. Hulst.

In the vicinity of Brooklyn during the last few years there has prevailed a disease which has carried off not only the caterpillars many have endeavored to raise, but very often larvæ have been found in the open air dead or dying. Caterpillars seem to differ very much in their sensitiveness to the disease, but in confined boxes, where it has prevailed, all succumb to its influence. In the open air in the Autumn full grown caterpillars of *Saturnia* Io., may be some years seen hanging dead from the branches on which they have fed Last Summer I saw a field of grain almost devoured by the Army Worm *Leucania unipuncta*, when suddenly the disease appeared among them and in a day or two none seemed to be alive. The stalks and ground were however covered with dead caterpillars.

However much we may desire the disease in the open air to destroy injurious insects, we do not want it in our breeding boxes, to destroy our rarities.

How shall we rid ourselves of it? If the cages be made in part or all of wood we would advise their utter destruction.

If large numbers are to be raised use the open air and netting. If smaller numbers or rarities use glassware.

I am told by Mr. Hermann Meeske, who has done considerable experimenting that he has found no good results to come from washing with soap, benzine, alcohol or carbolic acid water.

The only successful way of destroying the seeds of the disease was to thoroughly boil the feeding cages. He found that the germs or microbes would withstand any temperature below the actual boiling point.

We give his experience to those who may have suffered from the disease as the writer has during the last 4 or 5 years.

A New Species of Pterostichus.

By Henry Ulke.

Pterostichus Johnsoni, n. sp.

Elongate, depressed, parallel, shining black with a feeble purplish lustre; prothorax quadrate, longer than wide, feebly narrowed behind, sides margined in their entire length and feebly sinuate, front angles rounded at tip, base sinuate, hind angles rectangular, basal impressions long, deep and linear, outer ones very small. Elytra shining in the ♂, nearly opaque in the ♀, feebly rounded on the sides, sinuate near the tip and separately rounded; humeri rounded, striæ very deep, impunctured, interstices rather costiform, 1st, 2nd, 4th, 6th and 8th equal straight, 3rd and 5th broader and seven or eight times interrupted; the space between the 8th and the margin is still a little broader and the interrupted 9th costa forms about 15 or 16 tubercles. Prosternum narrowly margined between the coxæ; posterior tarsi slender with the first and second joints grooved in their entire length. Abdomen smooth, shining, last ventral segment with a semicircular impression in both sexes, somewhat deeper in the ♂. Length, .65 to .67 inch = 17 mm.

Oregon, several specimens. Belongs to Dr. Leconte's first division near *planctus* and is distinguished from all the other species by its peculiar sculpture of the elytra, which recalls somewhat that of *P. punctatissimus*, Randall.

I take great pleasure in dedicating this beautiful species to my friend Prof. O. B. Johnson of the Washington University in Seattle, to whom entomological Science is indebted for the discovery of many new and rare species in Oregon and Washington Territory.

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Entomologists of the Hatch Experiment Stations of the various States and Territories.

So far as we have been able to inform ourselves, the following is a list of the Entomologists connected with the Hatch Experiment Stations and their addresses.

Arkansas,—C. W. Woodworth, - - Little Rock, Ark.
Dakota,—L. H. Orcutt, - - - Brookings, Dak.
Delaware,—M. H. Beckwith, - - - Newark, Del.
Florida,—W. H. Ashmead, - - - Jacksonville, Fla.

We are not sure but Mr. Ashmead has resigned his position. His present address is 622 E St., Washington, D. C.

Georgia,—J. P. Campbell, - - - Athens, Ga.
Indiana,—F. W. Webster, - - - Lafayette, Ind.
Iowa,—C. P. Gillette, - - - - Ames, Iowa.
Maine,—F. L. Harvay, - - - - -
Massachusetts,—C. H. Fernald, - - Amherst, Mass.

Michigan.—A. J. Cook, - - Agric. College, Mich.
Missouri,—J. W. Clark, - - - Columbia, Mo.
Minnesota,—Hermann Oelrichs, - - - -
Nebraska,—Laurence Bruner, - - - Lincoln, Neb.
New Jersey,—John B. Smith, - New Brunswick, N. J.

Mr. Smith takes his position as N. J. State Entomologist April 1st. Till then his address will be National Museum, Washington, D. C.

New York,—J. H. Comstock, - - - Ithaca, N. Y.
Ohio,—C. M. Weed, - - - - Columbus, O.
South Carolina,—G. F. Atkinson, - - Columbia, S. C.

◆

Society Meetings.

Brooklyn Entomological Society, Dec. 4, 1888.—17 members present. The final report of the Committee of Conference with the Brooklyn Institute was made and articles of agreement in which all that was asked by the Society was granted were read and adopted and the whole report then ratified. By this the Brooklyn Entomological Society, while retaining its corporate existence and property, becomes the Entomological Section of the Brooklyn Institute.

Mrs. Annie Trumbull Slosson was unanimously elected a member of the Society.

In view of the Lecture to be given before the Brooklyn Institute on Feb. 14th by Mr. Hulst on the subject "The Habits and Instincts of Insects," it was thought advisible that some display of insects should be made by the Society. The Curators were appointed a Committee to attend to the matter of soliciting loans of specimens from members and making arrangements for their proper display.

On motion Geo. D. Hulst was unanimously elected Editor and Chris. H. Roberts Assistant Editor of Entomologica Americana for the year 1889.

After adjournment a sale of insects for the benefit of the Society took place realising the sum of $26.05.

Meeting Jan. 8, 1889.—13 members present. The Treasurer reported for the year receipts $592.29, disbursements $582.44. Balance on hand $9.75.

The Editors, Librarian and Curators also reported the condition of affairs in their various departments.

Election of Officers for the year 1889 was then held resulting as follows: Pres., Capt. T. L. Casey, U. S. A.; Vice-Pres., Rich. E. Pearsall; Treas., Chris. H. Roberts; Rec. Sec., A. C. Weeks; Corr. Sec., F. H. Chittenden; Libr. Hermann Meeske; Curator of Coleoptera, F. H. Chittenden; Curator of other Orders, A. C. Weeks; Exec. Committee: Pres. and Treas., *Ex-Officio*; Chas. Palm, Gustav Beyer, G. W. J. Angell, Ottomar Dietz, Henry Edwards; Pub. Committee: Editors, *Ex-Officio*; A. W. P. Cramer, E. L. Graef, R. E. Pearsall, F. H. Chittenden.

A paper was read written by Mr. Pearsall entitled "Notes on Rearing Lepidoptera." A considerable discussion followed principally upon the importance of reproducing the conditions of nature to insure success in breeding. The general sentiment seemed to be that many conditions of nature were injurious and destructive and the one who breeds insects rightly can far surpass Nature by taking advantage of what is shown to favor and by freeing from what works injury. In other words not Nature, but Nature at her best only should be followed.

A. C. WEEKS, *Rec. Sec.*

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ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, APRIL, 1889. NO. 4.

The EPIPASCHIINÆ of North America.

By Geo. D. Hulst.

[Continued from p. 52.]

CACOZELIA, Grote.

(*Kakos*, evil, and *zelos*, emulation).

Grote, Proc. Bost. Soc. N. Hist., XIX, p. 264, 1877; Geol. Surv. Terr. Bull., IV, 687, 1878, N. A. Ent., I, 10, pl. 2, f. 3; Meyrick, Trans. Ento. Soc. London, April, 1884, 65, Trans. Ento. Soc. London, Sept. 1887, 187.

Palpi strong, exceeding head, scarcely ridged in front; end member short on end of 2nd. Maxillary palpi strong, end lobes equal, somewhat pencil haired. Ocelli distinct. Antennæ somewhat serrate, doubly tritufted-pubescent basally and medianly, pubescent at end. Process strong, heavy, heavily clothed with rather long scales above and below and thus flattened, the upper scaling reaching down and about the base of the antennæ proper, thus making it to be set in a cup shaped fringing. Vestiture of wings less squammose than usual. Fore wing rather sharp at apex. Genitalia of ♂ having besides the normal armature, a strong inner curved hook or spur on each side. Legs, as usual except the hind tibiæ are stouter than ordinary and the spurs small, the upper pair very small.

Venation the same as *Epipaschia*.

Notwithstanding Mr. Meyrick places this as a synonym of *Stericta*, Led., I retain it as a good genus. Mr. Meyrick having only the incomplete diagnosis of Mr. Grote, which gave only characteristics which are found in *Stericta*, could not do other otherwise than as he did. The genus is not a strongly marked one; but the antennal process is so peculiar in shape and vestiture, the upper spurs on the hind tibiæ so nearly wanting, and the male genitalia so different that I still retain it.

C. basiochrealis, Grote, (*Cacozelia*), Proc. Bost. Soc. N. Hist., XIX, 264, 1877; Geol. Surv. Terr. Bull., IV, p. 687, 1878, N. A. Ento., I, 10, pl. 2, f. 3. 1879.

Palpi reddish rusty ocher, erect, surpassing head; end member quite short but distinct. Maxillary palpi with end members pineapple-shaped, equal in size, not very long haired. Fore wings rusty-ochreous. Interior line double, arcuate, rusty-brown; basal space ochery. A costal dark dot surmounting a faint concolorous-ringed discal mark; median field light stone-gray; median shade visible as a patch of dark, slightly raised scales. Posterior line rusty, double, inclosing a whitish shade, most distinct on costa, of the usual shape. Subterminally the wing is brown, washed with gray on external margin. A fine, terminal, dark line on both wings. Hind wings yellowish-gray, with a fine, denticulate, exterior line. Beneath ochreous; costa at base brown. Head and appendages ochreous; beneath, the fore and middle tibiæ are purplish; hind legs dotted with brown.

Tex., Colo. I have specimens from Texas taken in July and others taken in September, so that the species is probably double brooded.

STERICTA, Led.

(*Steridzein*, to be established).

Lederer, Wiener Monats. VII, 340, 1863; Meyrick, Trans. Ent. Soc. London, April 1884, 66; Trans. Ent. Soc. Lond., Sept. 1887, 187.

Glossina, Guen., Pyr. 124, 1854.

Toripalpus, Grt., Proc. Bost. Soc. N. Hist., XIX, 265, 1877; Geol. Surv. Terr. Bull. IV, 688, 1878; N. A. Ent., I, 10, pl. 2, f. 4; Meyrick, Trans. Ento. Soc. Lond., Sept. 1887, 187.

Winona, Hulst, Ento. Am., IV, 113, 1887.

Practically the same as *Epipaschia* except that the maxillary palpi in the males are pencillate tufted. There is also a decided shortening of the antennal process in the species. There is moreover no tendency to furcation in vein 1 of the fore wings, the vein being nearly straight to the base and thus not showing the tendency to furcation which is evident in a decided bending of the vein at base.

SYNOPSIS OF SPECIES.

1 Fore wings ocher yellow and fuscous .... **incrustalis**
Fore wings with more or less of reddish; cross lines distinct, basal strongly two waved, basal space shaded with reddish, middle field whitish fuscous gray, outer lines distinct, bent outward and angulated at middle 2
2 Basal field dark fuscous; within the basal line a subparallel black dash; hind wings dark fuscous............ .... **breviornatalis**
Basal field whitish, washed with reddish; middle field nearly white; hind wings light fuscous.. **trabalis**

S. incrustalis, Hulst, (*Toripalpus*), Ento. Am. III, 130, 1887.

Palpi rather slender, considerably exceeding front, end member pointed, prominent. Maxillary palpi small. Fore wings light ocher, washed and spotted with ocher fuscous, with a black point of raised scales at middle of base and on disc.

Basal field quite dark. Basal line of ground color indistinct but shown by the darker shadow lines. Middle field quite clear inwardly, ochery fuscous outwardly, this color divided by the veins which are light ocher. Outer line parallel with outer margin, waved inwardly, dentate outwardly. Outer fields ochery fuscous, lighter on veins. A marginal row of black points. Hind wings even fuscous, lighter towards base, with a marginal black line. Beneath fuscous with a reddish shading except on inner margins, the reddish being especially marked along costa of fore wings. Expands, 25 mm.

Venation the same as *E. superatalis*, except that 7 and 8 of the hind wings are stemmed.

Colorado. I continue this under *Stericta*, though it can not be be determined whether it belongs there or under *Epipaschia* until the male is known.

S. breviornatalis, Grote, (*Toripalpus*) Proc. Bost. Soc. N. Hist. XIX, 265, 1877; (*Toripalpus*), Geol. Surv. Terr. Bull. IV, 688, 1878; (*Toripalpus*), N. A. Ent., I, 10, pl. 2, f. 4, 1879.

This species is characterized by the antennal appendages being extremely short, hardly exceeding the collar. The labial palpi are longer, and the antennæ are much more lengthily ciliate compared with *Epipaschia*. The ornamentation, but not the color, is like *zelleri*. Fore wings reddish brown at base to the inner line, which is dark brown, preceded by a dark shade with raised scales, slightly outwardly produced on costa and submedially. Inner portion of median space washed with white on costal region and anteriorly. A discal dot. The outer line is dark brown, denticulate, produced over median nervules, whence it runs obliquely inwardly to internal margin. It is followed by a whitish corresponding shade-line. Terminal space washed with brown, becoming whitish before the margin. The outer line is situated much nearer the outer margin than in *zelleri*. A terminal dotted line distinct on hind wings. These latter are pale fuscous, with an outer dentate line followed by a white shade more or less noticeable. Terminal palpal joint marked with black, tipped with pale. Head and appendages reddish-brown; thorax becoming pale behind. Beneath, the wings are reddish-brown, becoming paler inferiorly. A common exterior line near the margin, and corresponding with the exterior lines on upper surface in shape. Fringes pale, obsoletely interlined. On hind wings beneath, a discal point. Expands, 25 to 30 mm.

Southern States, Texas, Colorado.

S. trabalis, Grote, (*Toripalpus*), Pap. I, 18, 1881.

As compared with *breviornatalis* which this species very much resembles and of which it is possibly a variety this species is much lighter in color, and shows a greater inclination to reddish. The inner part of the basal field and the greater portion of the middle field are powdery whitish, the hind wings being lighter fuscous than its congener. Expands, 25 to 30 mm.

Texas, Colorado.

ONEIDA, gen. nov.

(*Oneida*, an Indian tribe of Central New York, one of the Six Nations).

Labial palpi erect, much exceeding head, 2nd member long, end member short. Maxillary palpi invisible. Antennæ with pubescence longer than usual. Process long scaled beneath and on end, short scaled above, reaching to the thorax. Wings without fold or vitrifaction. Tarsi all spinulated. Epiphysis prominent. Hind legs with end pair of spurs only in ♂, both end and middle pair in ♀. Genitalia normal. Abdomen tufted laterally on ante- and penultimate segments in ♂. Venation—Fore wings 12 veins. Vein 1 bent, not furcate; 4 and 5 short stemmed; 6 stemmed at base with 7, 8 and 9; 10 and 11 separate. Hind wings 8 veins; 3 separate; 4 and 5 stemmed; 6 and 7 stemmed; 8 joined with 7 beyond point where 6 separates. Cell longer than usual, nearly or quite ½ wing.

I use this name as a generic name, following the example of Mr. Ragonot in some of his diagnoses of the *Phycitidæ*, and as well my own previous custom. It seems to me as appropriate under any circumstances to give insects the names of our N. A. Indian Tribes, as to give them the names of the ancient tribes and cities of Greece or Rome, and far more appropriate in case of N. A. Insects. And it also seems to me to be at least as appropriate to give these, as to give sesquipedalian polysyllabics, manufactured from words which the Greeks ought to have had in their language, if, as in many instances, they did not. It seems a pleasant fancy to see the spirits of the ancient dwellers of the American forests and plains still wandering in "night's shades," in the moths, the phantoms of the forest, mountain, and glen.

The armature of the hind tibiæ of this genus is remarkable, and at the writing of what was published last month had not yet been noticed. My number of specimens is small, and I can not further verify my observations, and I would hardly assert the facts were it not that in *Cacozelia* the upper pair of spurs is almost obsolete, and in the next genus *Yuma* the upper pair of spurs is certainly wanting.

O. lunulalis, Hulst, (*Toripalpus*), Ento. Am., III, 130, 1887.

Expands, 22 to 25 mm. Head and color yellowish brown, strongly washed with violet. Palpi brownish gray or yellowish gray in front, strong, recurved over head, scale tufted at end of second member, end member fine, distinct. Maxillary palpi very small, the end member set on the side but near the summit of the member next below, all invisible under ordinary observation. Ocelli very distinct. Antennal process short. Front of head rather heavily scaled, collar also run in somewhat of a ridge. Thorax dark fuscous. Abdomen light fuscous, the segments ringed with dark fuscous, extremity tufted in ♂ with lateral tufts on 2 segments preceding anal segment. Fore wings much rounded at apex, generally light even blue gray in color with a strong shading of fuscous on basal and outer fields. A dark broken cross line close to base not always distinct; near the outer edge of the field a dark line consisting of lengthened and raised scales, and extending quite across the wing. The line limiting the field is very indistinct and is evidenced rather by its hardly distinct shade lines. Middle field with three raised scale tufts, one discal small, the second extra-discal, more prominent and lengthened, the latter shaded outwardly, with fuscous, and a third near center of the field one-third from inner margin, black. Outer line quite distinct near costa, becoming obsolete posteriorly, shaded as usual, this shading being broad and diffuse near costa and outwardly occupying the whole apical space. The outer line forms a large sinus from the costa, and this with the shading and posterior obsolescence gives a distinctly lunular appearance to the apical markings. Outer field anteriorly fuscous divided by the yellow fuscous color of the veins—fading into the ground color posteriorly. Hind wings fuscous, smooth, dark at margin. Beneath fuscous on fore wings with a costal band lighter, the whole with a reddish tinge quite marked at apex. Hind wings reddish at angle, otherwise fuscous.

Can., N. Y.

YUMA, gen. nov.

(*Yuma*, a tribe of Indians of S. California).

Less robust than the other genera. Head comparatively small. Palpi long, curved back over head, heavily ridge scaled in front, thus becoming flattened, second member long, third short. Maxillary palpi long, pencil tufted in ♂, the lobes slenderer than usual, the antepenultimate member long filiform. Antennæ strongly bitufted pubescent, the tuftings on the basal and middle segments raised on slight protuberances 1/4 the diameter of the segment, showing a beginning of pectination; process short, slender, long scaled, without hairs. Wings without costal fold or vitrifaction. Abdomen slender, tufted laterally on anti- and penultimate segments. Genitalia normal, except that there are strong short lateral spines. Legs long, slender, hind tarsi only slightly spined at tips. Fore tibiæ with epiphysis rather heavy, first tarsus longer than tibia. Middle tibiæ not so long as femora, spurs long, the outer very long, equalling 2/3 tibia. Hind tibiæ with end-pair only of spurs, the tibiæ being twice the length of femora. Venation—Fore wings 12 veins; 1 not bent nor furcate, 3, 4 and 5 separate, 6 and 7 from a point, 9 and 10 stemmed with 8, 10 and 11 separate. Hind wings 8 veins; 3 separate, 4 and 5 joined at base, 6 separate, 7 and 8 stemmed beyond cell. Cell long, 1/2 length of wing.

Y. adulatalis, Hulst, (*Toripalpus*), Ento. Am., III, 129, 1887.

Expands, 20 to 26 mm. Head black with light gray scales intermingled. Tongue light gray. Palpi black and gray intermixed, both washed with reddish. Process whitish at base, becoming blackish at end, long scaled. Ocelli very distinct. Thorax reddish brown in front, gray behind. Abdomen gray, blackish at base, with lateral scale tufts on the 2 segments preceding anal segment. Wings on the basal field dark brown mixed with gray scales with a longitudinal light gray dash in center, running two-thirds the length of the field and ending in a black point of raised scales preceded by another. The field is limited quite distantly from base by a light gray strongly thrice waved line which has beyond it a shadow line of dark brown. Beyond this the middle field is gray, very light costally and centrally, darker posteriorly. Anteriorly slightly washed, and shaded with a black discal point of raised scales, posteriorly strongly shaded with brown which at the outer edge of the field is slightly reddish. The light gray centrally extends to the outer margin of the wing. Outer line clear at costa, shaded inwardly and outwardly with black, the outward shading making a large apical blotch. The line ends at the extension of the gray central field 1/4 from costa in a black longitudinal dash. It shows somewhat indistinctly on the posterior 1/3 in the continuation of the reddish brown of the middle field, and is there waved inwardly, dentate outwardly, and shaded on both sides with blackish. Outer field narrow, gray, except towards posterior angle where it is brown, slightly reddish. A black marginal line cut by the veins. Fringes interlined. Hind wings yellowish-white, somewhat fuscous, subpellucid. An outer line dentate outwardly on veins. A black marginal line cut at veins. Fringes interlined. Beneath dark fuscous washed over dirty white, an outer indistinct dentate white line on fore wings. Hind wings nearly as above but duller.

S. Cal., Tex. The Texas specimen was taken in October at light.

LANTHAPHE, Clem.

(Derivation unknown to me).

Clemens, Proc. Acad. Nat. Sci. Phil., June, 1860, 207.

Palpi of ♂ long, slender, smooth, somewhat recurved, end member small. Palpi of ♀ long, slender, end member long, conical, $^1/_3$ second member. Maxillary palpi bilobed, pencil tufted, the lobes large, heavy, the pencilling long, reaching above head. Antennæ very slightly pubescent, process short, long scaled. Fore wings strongly arched along costa. Along costa beneath in ♂ a fold of transverse scales with vitreous spot partially covered beneath, this spot also showing on the upper surface. Legs, tarsi all spinulated, of fore legs at tip only. Fore tibia longer than tarsus, epiphysis short, small. Hind tibiæ with 2 pairs of spurs, the upper pair just below middle. Venation—Fore wings ♂ 11 veins; 1 bent, notched or furcate, 2 and 3 much bent, 3 and 4 separate from end of broad and swollen post median, 6 long waved in discal space, 7, 8 and 9 stemmed, 10 and 12 separate, but closely pushed together, 9 wanting. Fore wings ♀ 12 veins; 4 and 5 short stemmed, 6 on a short stem with 7, 8 and 9; 10, 11 and separate, 1 bent and notched. Hind wings, ♂ ♀, 3 separate, 4 and 5 stemmed, 7 and 8 stemmed, 6 separate. Abdomen with short tufts laterally on penultimate and antipenultimate segments.

L. platanella, Clem.

Clemens, Proc. Acad. Nat. Sci. Phil. June, 1860, 207. Grote, (*Tetralopha*), Geol. Surv. Terr. Bull. IV, 691, 1878. Hulst, (*Lanthaphe*), Ento. Am., IV, 114, 1887.

Labial palpi pale brownish-red, touched in front with pale gray. Head and thorax brownish-red, the latter varied with grayish and dark fuscous. Fore wings grayish-fuscous, with the costa touched with brownish-red, and a patch of the same hue in the female, near the base of the inner margin containing a tuft of raised scales; in the male, blackish-brown, touched with brownish-red. The base of the wing is whitish. In the middle of the wing is a broad white band, obsolete toward the costa, with two straight blackish-brown lines internally with the same hue. The subterminal line is irregular and whitish, dark-margined internally. The hinder margin of the wing is touched with blackish brown. Hind wings pale brown, somewhar darker toward the hinder margin. The larva is tortriciform in appearance. Head pale brown, mottled with whitish. Body with isolated hairs, pale green, with a dark brown dorsal line and a fainter stigmatal line of the same hue, or pale reddish, with a brown dorsal line on each side of the vascular. It makes a web on the under surface of the leaf of Sycamore (*Plátanus occidentalis*), drawing it together and living within a silken tube. The cocoon is woven on the surface of the ground, in form of a flattened oval, consisting of brown silk covered exteriorly with grains of earth. The larvæ remain in it unchanged during the winter. It may be taken in July, and enters the pupa state during the latter part of August, to appear as an imago in May or June. Expands, 20 to 25 mm.

Eastern U. S. This is Clemens' description. Neither he nor Mr. Grote was aware of the variation of the sexes in venation.

SALUDA, Hulst.

(*Saluda*, a tribe of Indians of the Southern States).

Hulst, Ento. Am., IV, 113, 1888.

Palpi of ♂ heavily scaled, recurved over head, reaching back of collar, second member very long. end member very short in front of end of second member; ♀

erect, end member comparatively long. Maxillary palpi pencil-tufted, the bilobed members heavy, long, the penciling very long and heavy. Antennal process short, long scaled. Wings with heavy costal fold and vitreous spot beneath in ♂. Legs rather heavy, loosely scaled, tarsi spinulated, on fore legs only at tip. Genitalia with furcate base of uncus curved upward. Venation as in *Lanthaphe*, but 6 is separate in fore and hind wings, and 10 and 11 are stemmed in the fore wings.

I am not altogether certain this venation is constant, so far as vein 6 is concerned. The specimens I have examined vary so much that others may be found to correspond with *Lanthaphe*. In that case the genus would rest on the stemming of 10 and 11 in the fore wings.

SYNOPSIS OF SPECIES.

Basal field gray, lines generally indistinct, outer one bent dentate.....**asperatella**
Basal field blackish or black, lines distinct, basal straight or a little rounded, double, the outer curved, even..........................**melanogrammos**

S. asperatella, Clemens.

Clemens, (*Lanthaphe*), Proc. Acad. Nat. Sci. Phil. June, 1860, 207. Grote, (*Tetralopha*), Geol. Surv. Terr. Bull. IV, 691, 1878. Hulst, (*Saluda*), Ento. Am., IV, 113, 1888.

Labial palpi blackish-brown, varied with whitish. Thorax pale grayish, varied with grayish or dark gray. Fore wings dark brownish-gray, with a blackish-brown tuft of scales in the basal part of the fold, and a smaller one of the same hue on the disk above it, a whitish median band, sometimes almost obsolete, containing on the disk a small blackish-brown tuft in the female, with an internal crenated blackish line, and shaded toward the base with blackish; on its external margin is a line of raised scales. The subterminal line is pale grayish, angulated and margined internally by a blackish line, and externally by a fainter one produced into points on the nervules. The hinder marginal line is black. Sometimes in the female base of the wing is whitish, slightly touched with luteous. Expands, 22 to 27 mm.

Can., Eastern U. S. to Texas. Feeds, I have been told, on Locust. Taken in Texas, in August.

S. melanogrammos, Zell. (*Tetralopha*), Verh. Zool. Bot. Ver., p. 546, pl. 3, f. 24, *a*, *b*, 1872. Grote, (*Tetralopha*), Geol. Surv. Terr., IV, 689, 1877.

Diluculella, Grote, (*Tetralopha*), N. A. Ent., I, 60, 1880, l. c. 68, pl. 5, f. 10, 1880. (*Tetralopha*), Geol. Surv. Terr. Bull., VI, 589, 1880. (*Tetralopha*), Dept. Agric. Rept. 1880, p. 263.

Talleolalis, (*Toripalpus*), Hulst, Trans. Am. Ent. Soc., XIII, 160, 1886; Ento. Am., III, 22, 1887.

Head, palpi and thorax dark fuscous gray, the thorax with a very slight tinge of russet. Abdomen yellowish fuscous, interlined on segments with dark fuscous. Wings dark fuscous, light at base and on middle field. The basal cross line double, black, oblique, rounded slightly, sometimes almost straight. Base within the lines with a reddish shade and a black indeterminate line near middle of basal field. Middle field generally much lighter gray, especially basally. Outer line even, bent beyond cell, edged outwardly with light gray. Marginal line black, broken. Hind wings dark fuscous.

Fla., Texas. Probably everywhere in East and South.

The determination of this insect as above is I think the correct one. Zeller's type was smaller than the type of *diluculella*, Grt., but the figure Zeller gives, and the type in the Cambridge Museum allow no other determination as it seems to me. There is a great deal of variation in the depth of coloring in the species, and *diluculella* might stand as a varietal name for the form with the black basal field. The insect is 2-brooded in Texas and the varieties incline to be seasonal, *diluculella* being the larger and darker Summer brood. *Talleolalis* is a synonym of the type form.

Prof. Comstock, in Dept. Agric. Report, 1880, gives a history of the insect as follows:

"*Larva.*—Length when full grown 20 mm., cylindrical, slightly tapering posteriorly and quite stout, of a dull greenish yellow color, somewhat paler beneath, with a narrow black stripe on each side about twice the width of the last, and equally distant from it and the middle of the dorsum. This stripe extends from the thoracic to the anal plate. The head, thoracic and anal plates are of the same ground color as the body. Eyes and end of mandibles black; several irregular black bands on each side of the head, extending from the posterior side forward to about the middle; thoracic and anal plates with a few scattered brown dots, the latter with an irregular row of black points across the anterior side.

Pupa.—Length 11 mm., robust, light brown, rounded at both ends, the posterior armed with a cluster of fine hooks; the abdominal segments are covered with coarse punctures except on the posterior edge. Wing covers extend to the end of the 4th abdominal segments."

"Some of the terminal twigs of pine (*Pinus taeda*) infested by the larvae of this insect where collected by myself in January, 1880, near Jacksonville, Fla. The appearance of these infested twigs is somewhat striking; the leaves around the end are loosely held by threads of silk, which also holds the excrements of the larva in a more or less irregular mass, varying from 1 to 3 inches in length and from 1 to 2 in thickness.

The larva is about eight-tenths of an inch in length, rather stout, of a greenish yellow or drab color, with two very distinct, quite broad black dorsal stripes, and a narrow one on each side.

When mature the larva descends to the ground, where it spins a loose cocoon of yellowish brown silk, to which is attached a covering of grains of sand or other loose materials, and within which it transforms to a pupa, in which state it passes the winter.

The moths from the larvae mentioned above emerged during the following April."

Taken in Texas in April and Aug. and consequently two-brooded.

TIOGA, Hulst.

(*Tioga*, a tribe of Indians of New York and Pennsylvania).

Ento. Am., IV, 113, 1888.

Palpi long, thin, scaled, extending much above head. 2nd member very long, end member short in ♂ ; end member in ♀ slender, pointed, quite long. Maxillary palpi pencil tufted. Process short. Wings in ♂ as usual, with scale pad and vitreous spot beneath, the vitrifaction small. Legs—tarsi spinulated at tip only. Tibial epiphysis short, small. Spurs of middle and hind legs long, the hind tibiæ having two pairs. Venation—Fore wing 11 veins ; ♂ with, it seems to me, 11 wanting ; otherwise much after the pattern of *Lanthaphe*, but 2 and 3 are slightly bent and the lower median is not much swollen. ♀, 1 furcate near base, 3 near angle, 4 and 5 from a point, 6, 7, 8 and 9 stemmed, 11 wanting, 10 and 12 separate. Hind wings, 3 close to angle, 4 and 5 stemmed, 6 widely separate, 7 and 8 stemmed beyond cell. Cell short.

T. aplastella, Hulst.

Hulst, (*Tioga*), Ento. Am., IV, 113, 1888.

Expands, 18 to 20 mm. Head light gray ; antennæ dark fuscous ; thorax blackish gray ; abdomen yellowish brown ; base of each segment blackish ; fore wings light gray ; basal field blackish, limited by a light gray cross line edged with black on either side ; basal half of middle field of ground color, outer half fuscous ; outer line light gray, edged within with black ; outer field fuscous ; veins lighter, a row of submarginal black spots ; hind wings yellowish brown, blackish along edge.

Texas, April. This has very decidedly the appearance of *Hemimatia scortialis*, Led., but the maxillary palpi are present and distinct, while in *Hemimatia* they are wanting. On this account also *Hemimatia* can not be *L. diluculella*, Grote, which also it resembles.

TETRALOPHA, Zell.

(*Tetra*, four, and *lophe*, crest).

Isis, p. 880, 1848. Grote, Geol. Terr. Bull., IV, 688, 1878, N. A. Ent. I, 10, pl. II, f. 5, 1879.

Wanda, Hulst, Ento. Am., IV, 114, 1888.

Katona, Hulst, Ento. Am., IV, 113, 1888.

Loma, Hulst, Ento. Am., IV, 113, 1888.

In all respects very much the same as *Tioga*, except that in fore wings 1 is never furcate, and in ♀, 6 is separate from 7.

In view of the radical difference in venation between ♂ and ♀ and the variability of 4 and 5 in both wings, I established a number of genera, which further study has led me think must all be referred to *Tetralopha*.

SYNOPSIS OF SPECIES.

1 Basal line double distinct 2
Basal line indistinct, single 3
2 Basal field of fore wings reddish ; hind wings dark fuscous .... **nephelotella**
Basal field of fore wings gray ; hind wings light fuscous .... **robustella**
3 Outer field of fore wings reddish .... **baptisiella**
Outer field of fore wings gray 4

4 Posterior margin of fore wings within basal line with reddish oval spot...**militella**
Without reddish spot..5
5 Middle field of fore wings with heavy dentate black line from cell to posterior margin. Hind wings dark fuscous..**tiltella**
Middle field of fore wings with a central black tufting; hind wings light pellucid fuscous..**euphemella**

T. nephelotella, Hulst, (*Loma*), Ento. Am., IV, 114, 1888.

Expands, 25 mm. Head light gray, slightly reddish brown on summit; thorax and abdomen light yellowish brown, the segments of abdomen fuscous at base; fore wings reddish brown at base, with a central dark dash, and dark along inner margin; basal line whitish, edged both sides with blackish, slightly outwardly oblique towards inner margin, slightly rounded with angle inwardly at middle; middle and outer fields dark fuscous; outer line lighter, edged within with blackish; hind wings dark fuscous.

Penn.—I have this in the ♀ only. It is in appearance very much like *S. asperatella*, Clem., but it has 11 veins in the ♀. If the ♂, as is possible, lacks the costal fold and aberrant venation in the ♂, *Loma* will stand as a good genus.

T. baptisiella, Fernald, (*Tetralopha*), Ento. Am., III, 128, 1887.
Hulst, (*Wanda*), Ento. Am., IV, 114, 1888.

Wings, ♂ light fuscous with a slight ocher tint, heavily marked with darker fuscous on the costal region, running from a point on costa at base, along and parallel with the inner margin to outer cross line forming a triangular space, the lighter ground color showing distinctly between the veins. Inner cross line obsolete, or showing in a faint curved gray shading. A black point of raised scales at middle of basal field. Outer cross line $^3/_4$ out; sub-parallel with outer margin except a bend outward towards posterior angle, straight at costa, otherwise evenly dentate wavy. On the middle field just out from the first cross line is a cross line of lengthened scales whiter than the ground color. Outer field fuscous, lighter posteriorly and at veins. A marginal row of lengthened black points. Fringe grayish fuscous interlined. Hind wings fuscous with faint indications of outer lighter band. ♀ with lines as in the ♂ but basal field much lighter, the central cross band of long scales almost white, and the rest of the wing washed with russet ocher, the veins on the outer middle field blackish. A narrow gray shading next the marginal black points. Hind wings as in ♂. Beneath, ♂, ♀, fuscous on costal half of fore wings, light ocher fuscous, otherwise with faint outer band on all wings.

Food plant, *Baptisia*. May. Hab.—N. Y., Mo.

T. tiltella, Hulst, (*Wanda*), Ento. Am., IV, 114, 1888.

Expands, 20 mm. Head, thorax and fore wings gray, peppered over with black scales, giving a general blackish gray color; basal space somewhat darker than the rest of the fore wings; at the middle of basal field a jet black cross-line not reaching costa or inner margin; inner line light gray, three times dentate inwardly; at the middle of the middle field is another yet black cross line extending from inner margin nearly to discal spot; outer line straight from costa angulated outwardly, then rounded, wavy dentate, returning near inner margin, then with a single bent reaching ihe margin. Hind wings dark fuscous.

Hab.—Tex. June, July, August.

T. robustella, Zeller, (*Tetralopha*), Isis, 881, 1848. Grote, (*Tetralopha*), Geol. Surv. Terr. Bull., IV, 690, 1878.

Head and thorax fuscous gray, abdomen yellowish. Fore wings cloudy fuscous gray with a slightly russet shading at times. Middle field lighter, just beyond basal line often light gray. A cross band of larger scales on basal field rising into a black tufting near middle. Another near middle of middle field, often forming a dentate black line, sometimes only scattered black dots, this scale ridge also with 2 or 3 tuftings. Outer line quite even, strongly bent. Hind wings light pellucid fuscous, outer line evident darker fuscous. Expands 18 to 25 mm.

Central Texas, August. I have not been able to examine the venation of this insect but have little doubt it belongs to *Lanthaphe* rather than *Tetralopha*. As determining *Tetralopha* I take the first species described under it, viz: *militella*, Zell., as the type of the genus.

T. militella, Zell. Isis, 880, 1848. Grote, Geol. Surv. Terr. Bull., IV, 689, 1878.

Head and thorax fuscous gray. Fore wings with very convex fore margin, obtuse apex and rounded posterior angle. Color fuscous gray, washed slightly with russet, lines rather indistinct, the outer bent and dentate beyond cell, with light gray edging outwardly. At outer part of basal field along inner margin an oval reddish spot surmounted with a black scale tuft; generally also a russet shading at posterior angle. Hind wings dull fuscous. Abdomen yellowish fuscous, basal segment blackish, the others annulated with darker and lighter coloring.

Central Texas, August.

T. euphemella, Hulst, Ento. Am., IV, 114, 1888.

Expands, 17 mm. Front dark gray; antennæ blackish; thorax dark blackish gray; abdomen yellowish fuscous; fore wings light gray, more or less overlaid with black; base gray; basal line black. diffuse, dentate, edged outwardly with a band of blackish gray; outer line white, straight at costa and inner margin, bent outwardly and sinuate between; discal points distinct black; outer space gray with apical dash of blackish; tufts blackish gray, or blackish; hind wings light fuscous, fuscous on veins; beneath light fuscous gray, the markings above faintly produced.

Central Texas, March. Possibly not really distinct from *T. tiltella.*

ATTACAPA, gen. nov.

(*Attacapa*, a tribe of Indians of Louisiana and Texas).

Very much as in *Tioga*, but the antennal process is entirely wanting, the basal member being merely swollen posteriorly. Venation—11 veins; ♂ as usual, but the inner median is very little swollen, and the vitreous spot almost or quite lost, 1 not furcate at base. ♀, 1 not furcate, 3 separate, 4 and 5 long stemmed, 6, 7, 8 and 9 stemmed. Hind wings, 3 at angle separate, 4 and 5 long stemmed, 6 at a point with 7, 7 and 8 stemmed beyond, cell small.

A. callipeplella, Hulst, (*Tetralopha*), Ento. Am., IV, 114, 1888.

Expands, 16 mm. Palpi, head, antennæ and thorax uneven fuscous gray; fore wings gray, rather strongly overlaid with blackish, more especially on the basal field; extreme base and posterior portion of basal field reddish; basal cross-line white, slightly waved, distinct, edged on both sides with distinct fine black lines; discal spots black; outer line gray, straight from costa, then rectangular outward, then rounding forming a deep sinus shorter than usual, then angulate and slightly bent to inner margin; veins on middle and outer fields rather darker than ground color; marginal line black; hind wings light fuscous, darker on the outer margin.

Hab.—Texas.

While writing the first part of this article, published last month, I thought it wise in view of doubts existing in my mind not to place in the list a species (*Tallula atrifascialis*) described by me as one of the *Epipaschiinæ*.

I have been able by the sacrifice of one of my types to carefully study the species since and have concluded that it must be catalogued as one of the *Epipaschiinæ*. I therefore add it, merely noting my opinion that it would be best placed after *Yuma*, and before *Lanthaphe*.

TALLULA, Hulst.

(*Tallula*, Indian name in Texas).

Ento. Am., IV, 114, 1888.

Palpi erect, long, thin; end member comparatively long. Maxillary palpi present, not bilobed, but end member nearly at summit of 2nd. Antennæ heavily bitufted pubescent in both sexes, but more prominently in ♂. Process almost obsolete. Tongue strong, clothed with long scales in front at base. Wings with scale ridges and tuftings, without costal scale ridge and vitrifaction beneath; apex somewhat sharper than usual, ♂ genitalia normal, with furcate base of uncas bent upward. Legs—tarsi spinulated, hind tibiæ with 2 pair of spurs. Venation—fore wings 12 veins; 1 bent, not notched, nor furcate, 3 close to angle, 4 and 5 short stemmed, 6 at a point with 7, 7, 8 and 9 stemmed, 10, 11 and 12 separate. Hind wings 8 veins; 3 close to angle, 4 and 5 short stemmed, 6 short stemmed with 7, 7 stemmed with 8 beyond separation from 6; cell short.

Notwithstanding the 12 veins of the fore wings, this species is very closely allied to the *Phycitidæ*. But, as the result of careful study I think now that it must be placed with the *Epipaschiinæ*. The lack of bilobing in the maxillary palpi is the most serious objection to such a reference, and the antennal process is almost obsolete, but otherwise its affinities are here. Still the end member of the maxillary palpi is not on the summit of the next and the process is clearly indicated.

It does not seem to me the difficulty would be lessened by referring it to the *Pyralidinæ*, but rather much increased.

It has been suggested to me that this species might be *Anæglis dismissalis*, Led., since Lederer's figure very strongly resembles it. But *Anæglis* has neither tongue nor ocelli, apart from differences in venation.

The original generic description was faulty owing to a poor preparation for study. The above corrected diagnosis can, I think, be relied upon.

T. atrifascialis, Hulst, (*Tetralopha*), Trans. Amer. Ento. Soc., XIII, 160, 1886; (*Tallula*), Ento. Am., IV, 115, 1888.

Expands, 18 to 22 mm. Palpi white, black at ends; head, thorax and antennæ pure white, with some black scales intermixed; thorax with three black spots posteriorly; fore wings pure white, more or less heavily mixed with black scales, giving a snowy cinereous aspect; a black costal spot at base; the first line black, broad at costa, then constricted nearly or quite separated at middle, then broadening to margin, following inner margin to base in a fuscous shade; outer line white, sinuous, lined within with fuscous; a large, black, costal, apical triangle; black points on either side of outer line on inner margin; a marginal line of black dashes; fringe white, interlined brokenly with black: hind wings light fuscous, black marginal line; fringe as fore wings; beneath, fuscous on fore wings and anterior margin of hind wings; fringe as above. Abdomen cinereous, annulate with fuscous.

Southern States and Texas. October.

On page 47, 10th line from the bottom, there is an important error, "coalescing of 10 and 11," should be "8 and 9." And on page 45, 7th line from the top, "*Oneida lunulalis*" should be "*Yuma adulatalis.*"

Tetralopha enthealis, Hulst, Trans. Am. Ent. Soc., does not belong here. The type is a female, and is probably a synonym of *Aglossa domalis*, Guen., though very decidedly differing in shape of wings from all females of that species I have seen.

It may be that Mr. Walker has described some of our species in the British Museum Catalogue. But so far, no way has presented itself by which I could make reliable comparison with Walker's types, and nothing can be determined from the descriptions.

In the introductory part of this article I have shown that in the most of respects the *Epipaschiinæ* find correspondences among the *Phycitidæ*. The principal and almost only material point in which there seemed to be a distinction was in the frenulum, which in the ♀ of the *Epipaschiinæ* is double, while in the *Phycitidæ* it is single. I had felt certain that even this was not absolute in view of the peculiar formation of the frenulum in the ♀ of the *Phycitidæ*, but at the time of writing was able to give no proof. Among the *Phycitidæ* the ♂ has the single heavy spine; the ♀ also has one spine but it consists of two, or more generally, 3 or 4 joined together. This is very evident at the base where the separate sockets are easily seen, and there is morever a flatness and waviness of the basal portiou to correspond. After the examination of various specimens I have at last found an undoubted ♀ *Anerastia tetradella*, Zell., in which the frenulum is divided to the base, and is therefore double as in the *Epipaschiinæ*.

In addition I have made some comparative observations on the females of the *Epipaschiinæ* and *Phycitidæ*. So little has been said (if anything at all) upon the genitalia of the females in any family that I made no observations. I find however, as the result of my study since, some interesting facts. The female genitalia in the *Epipaschiinæ* have a certain specialization for the purpose of oviposition. The last two segments are provided with an extensile apparatus, consisting of a chitinous projection within and on either side of the oviduct. Those of the last segment control the end of the ovipositor, which is somewhat spatulate covered with stout hairs, the opening being underneath the spatulate portion. Those of the penultimate segment control the last segment. These give not only an extensile power, but act through the muscles in propelling the egg to the end of the abdomen. This structure is essentially the same in the *Phycitidæ*. It also exists in the *Galleriidæ*, in the ♀ of some of which the extensile apparatus is very long, enabling the insect to double the length of the abdomen.

I find also on some of the insects in the female a couple of stout projecting spines on the underpart of the abdomen. These are pretty close together in *T. tiltella* and on the antepenultimate segment; in *T. aplastella* wider apart on the second segment anterior to that. These are probably used in assisting the newly emerged imago from the cocoon.

In view of the above I reiterate my opinion that the *Epipaschiinæ* and *Phycitidæ* are very nearly allied and am strongly inclined to believe the *Epipaschiinæ* should be regarded as a subfamily of the *Phycitidæ*.

In view of the introduction of *Tallula atrifascialis* I add an amended Synopsis of Genera.

SYNOPSIS OF GENERA OF N. A. EPIPASCHIINÆ.

1 Fore wings of ♂ simple, 12-veined in both sexes 2
Fore wings of ♂ with costal fold and vitreous spot beneath 7
2 Maxillary palpi present, hind tibiæ of ♂ with 2 pair of spurs 3
Maxillary palpi invisible, hind tibiæ of ♂ with end pair af spurs only .... **Oneida**
3 Antennal process more or less strong, maxillary palpi bilobed at end 4
Antennal process nearly obsolete, maxillary palpi not bilobed .... **Tallula**
4 Hind tibiæ with 2 pairs of spurs 5
Hind tibiæ with end pair of spurs only .... **Yuma**
5 Maxillary palpi scaled in ♂ .... **Epipaschia**
Maxillary palpi pencil tufted in ♂ 6
6 Process long .... **Cacozelia**
Process short .... **Stericta**
7 Fore wings 11-veined in ♂, 12-veined in ♀ 8
Fore wings 11-veined in both sexes 9
8 Fore wings, 10 and 11 separate; 6 stemmed with 7, 8 and 9 in ♀ ... **Lanthaphe**
Fore wings, 10 and 11 stemmed, 6 separate .... **Saluda**
9 Maxillary palpi present; antennal process more or less developed 10
Maxillary palpi invisible; process hardly indicated .... **Attacapa**
10 Fore wings 6, 7, 8 and 9 stemmed in ♀ .... **Tioga**
Fore wings 6 separate in ♀ .... **Tetralopha**

CATALOGUE OF GENERA AND SPECIES.

EPIPASCHIINÆ, Wals.

Epipaschiæ, Grt.
Epipaschiidæ, Meyr.

I.—EPIPASCHIA, Clem.

Deuterolyta, Led.
Mochlocera, Grt.
Catamola, Meyr.
Astrapometis, Meyr.

1. **superatalis**, Clem.
conspicualis, Led.
borealis, Grt.
olivalis, Hulst.

II. CACOZELIA, Grt.

2. **basiochrealis**, Grt.

III.—STERICTA, Led.

Glossina, Guen.
Toripalpus, Grt.
Winona, Hulst.

3. **incrustalis**, Hulst.
4. **breviornatalis**, Grt.
5. **trabalis**, Grt.

IV.—ONEIDA, Hulst.

6. **lunulalis**, Hulst.

V.—YUMA, Hulst.

7. **adulatalis**, Hulst.

VI.—TALLULA, Hulst.

8. **atrifascialis**, Hulst.

VII.—LANTHAPHE, Clem.

9. **platanella**, Clem.

VIII.—SALUDA, Hulst.

10. **asperatella**, Clem.
11. **melanogrammos**, Zell.
talleolalis, Hulst.
var. **diluculella**, Grt.

IX.—TIOGA, Hulst.

12. **aplastella**, Hulst.

X.—**TETRALOPHA**, Zell.

Loma, Hulst.
Wanda, Hulst.
Katona, Hulst.

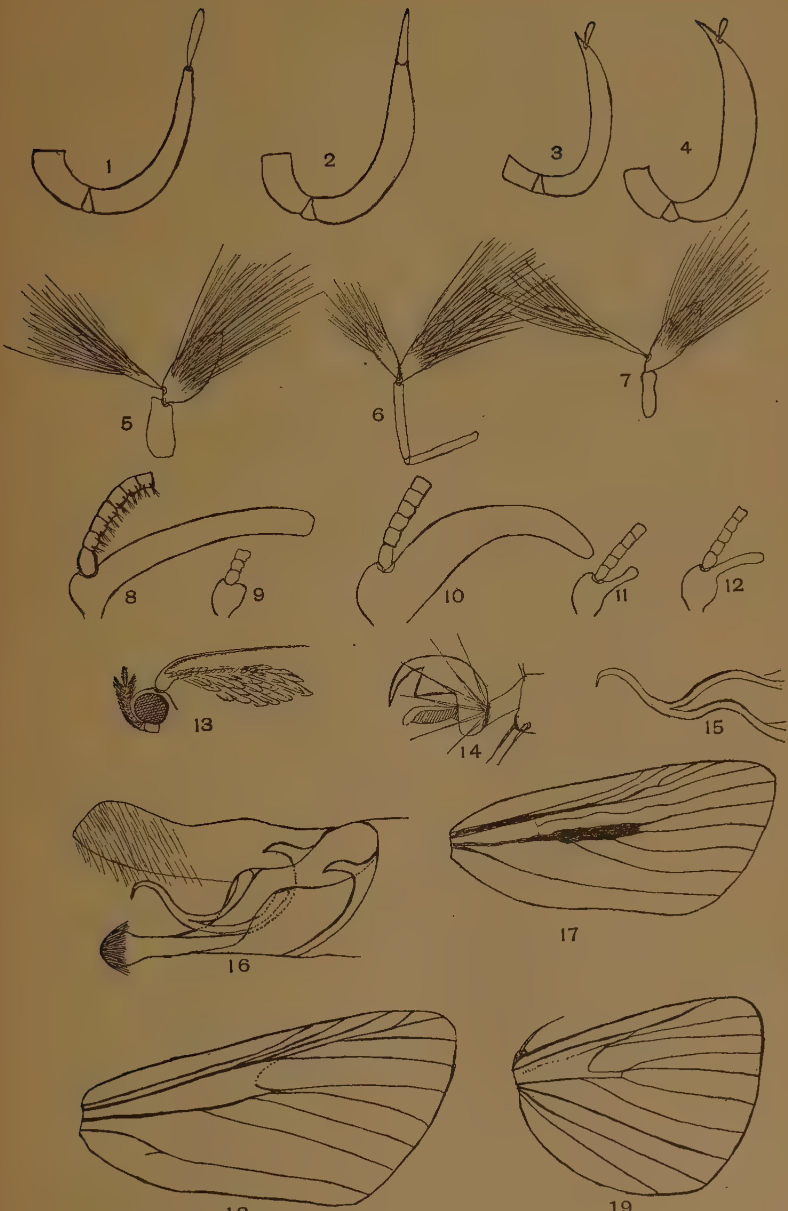
13. **nephelotella**, Hulst.
14. **robustella**, Zell.
15. **baptisiella**, Fern.
16. **militella**, Zell.
17. **tiltella**, Hulst.
18. **euphemella**, Hulst.

XI.—**ATTACAPA**, Hulst.

19. **callipeplella**, Hulst.

EXPLANATION OF PLATE.

Fig. 1. Palpus of Tetralopha robustella, ♂.
" 2. " " Lanthaphe platanella, ♀.
" 3. " " Tetralopha baptisiella, ♂.
" 4. " " Saluda asperatella, ♂.
" 5. Maxillary palpus of Saluda asperatella, ♂.
" 6. " " " Tetralopha baptisiella, ♂.
" 7. " " " Yuma adulatalis, ♂.
" 8. Antennal process of Epipaschia superatalis, ♂.
" 9. " " " Attacapa callipeplella, ♂.
" 10. " " " Cacozelia basiochrealis, ♂.
" 11. " " " Tetralopha baptisiella, ♂.
" 12. " " " Tioga aplastella, ♂.
" 13. Head of Epipaschia zelleri.
" 14. Claw of " "
" 15. Uncus of Saluda asperatella, ♂.
" 16. Genitalia of Cacozelia basiochrealis, ♂ (uncal parts protruded).
" 17. Venation fore wing of Tetralopha baptisiella, ♂.
" 18. " " " Epipaschia superatalis.
" 19. " hind wing " "



COLLECTING NOTES.

By H. F. Wickham.

The occurrence of a *Brachynus*, determined by Dr. Horn as *cinctipennis*, Chev., at Albuquerque, N. Mex., adds a very pretty and easily recognized species to our fauna. Three specimens were taken in July.

Ctenistes pulvereus, Lec., occurs at Williams, Arizona, under Pine bark in October, and *Fustiger fuchsii*, Br., was taken in the same locality, with a small black ant which makes its nests above ground in dried cow droppings. Six specimens were found early in May. The occurrence of this species so far West is of interest, and the ant with which it lives is a different species from any that I have seen in the East. Mr. Ulke writes me that he sees no difference in my specimens of *F. fuchsii* and his types from Tennessee.

Hetærius tristriatus, Horn, was taken at Coolidge, New Mexico, at an elevation of about 7,000 ft. My specimen was found in the evening resting on a stone under which was a colony of ants. This species was described from Calaveras, Cal.

At Needles, Cal., I had my first experience with *Gyascutus planicosta*. Here they were quite numerous, but so extremely active that it was with difficulty that I got four or five of them the first day. They are seen clinging to the twigs of a gummy bush, growing in sandy spots away from the river, and take flight at the slightest alarm. However, I succeeded in getting a nice lot of them by rising next morning before the sun, when I found them on the twigs, quite inactive and easily taken by hand without the use of a net. In this way I took more of them in one hour than I could have taken in ten, had I waited until day advanced.

Niptus ventriculus, Lec., is sometimes gregarious, as I found a colony of about 35 individuals, at Winslow, Arizona, May 5th, all close together under an old log. This species probably breeds in old wood, as there was nothing under the log but sand, and many others of this family are lignivorous.

One of the characteristic features of the insect fauna of the Southwest is the occurrence in large numbers of many fine *Otiorhynchidæ* and *Cleonini*. These occur both on plants, and around the roots in the sand.

Ophryastes vittatus is found chiefly on the "greasewood," high above ground on young shoots; while *O. sulcirostris* and *O. latirostris* occur around the roots of this and other plants, being it seems not so fond of climbing. The color of the two last mentioned species agrees better with that of the soil than does the color of *O. vittatus*, but is not so well adapted to the purpose of concealment, when high up among the leaves. A very pretty new species of this genus rewarded my search.

Two, or possibly three, species of *Eupagoderes* are also found in the same locality and situation, one of them, *Eu. sordidus*, preferring low plants.

Diamimus subsericeus was taken around the roots of cottonwoods, and *Peritaxia hispida*, rare, under pieces of bark or logs, the former at Winslow, the latter at Walnut, Arizona. *Eucyllus vagans* was found under ties at Barstow, Cal., *Pandeletejus cinereus* and *Cyphus lautus* at Peach Springs, Arizona, around the roots of scrubby brush.

Among the *Cleonini* were the following species—*Lixus pleuralis*; *Centrocleonus molitor* and *angularis*; *Cleonopsis pulvereus*; *Cleonus frontalis*, *virgatus*, and *quadrilineatus*—all of which, with the exception of the first two, occurred almost entirely on the ground, at the roots of low plants.

Species of *Dorytomus*, *Bagous*, *Tychius*, *Acalles*, *Zascelis* and others also frequent these situations: so it will be seen that it will pay collectors in the Southwest to give considerable attention to this mode of collecting,—which I found to yield better returns in *Rhynchophora*, and some other groups, than any other way I could devise.

◆

List of the ORTHOPTERA found on Staten Island.

By Wm. T. Davis.

Staten Island offers in its few square miles natural features as diversified as they could well be in so small an area at this part of the coast. The expanse of salt meadow, the moderately high hills in the interior, many of which are still wooded, and the sand dunes and barren ground along the Kills and at Tottenville, are each inhabited by species of *Orthoptera* that very rarely or never leave them.

Anaxipha exigua seems to be confined to the salt meadows and only one specimen of *Conocephalus exiliscanorus* has been taken at a distance from the salt water creeks near which it makes his home. *Paroxya atlantica* is particularly numerous on these meadows and the species of *Xiphidium* and *Stenobothrus* are also found plentifully in the same situation. *Dissosteira collare* and *Psinidia marmorata* have only been found on the sand dunes and barren ground along the Kills, and *Melanoplus collinus* is also most plentiful in the same localities. *Chlœaltis conspersa* occupies the hills and particularly the edges of pastures and in waste places.

With the exception of *Periplaneta americana*, which has been reported inhabiting green houses, all the species have been captured by me. The month when the first imago has been observed on the Island, is indicated, in nearly every case, after the specific name, from which time until frost they are usually to be met with.

The chief difficulty in the preparation of the list has not consisted in capturing the specimens, though, as already stated a few are rare and others local, but has centered more particularly about the disputed species. Mr. Samuel H. Scudder has identified many of the specimens and some have also been inspected by Mr. Lawrence Bruner.

Nearly all of the species mentioned will be found described at some length in "The Orthoptera of New England," by C. H. Fernald, published in the Thirty-fifth Annual Report of the Mass. Board of Agriculture. Seventy-one species are noted in that work and it will be observed that sixty-three are here recorded.

GRYLLIDÆ.

Gryllotalpa borealis, Burm. August.

This insect is not difficult to capture. It can be located in the muggy places that it inhabits by it song and may be easily probed out of the tunnel with the finger. If the captive specimen is placed on the ground it will begin straightway to dig, or if put on a handkerchief or piece of paper, go through all the motions necessary to bury itself under natural conditions.

Gryllotalpa columbia, Scudder. August.

This form does not differ from the preceding, except in length and size of wings; a common variation in *Gryllus* and in insects of other orders. It is often attracted by light, at least, I have a specimen that was captured in a barber shop and another found in a parlor.

Gryllus abbreviatus, Serville.
" **luctuosus,** Serville.

Gryllus may be heard stridulating on the last days of May and from thence onward to frost. Many of the immature live under stones &c. over winter, and if they are placed in a box together they speedly fight, and the weaker ones are devoured.

Nemobius vittatus, Harris. Late June and July.

This insect is quite pugnacious and will sometimes bite savagely when poked with a straw, even coming forward to meet it, after several apparent failures on the part of the straw to do it any damage. They will also quarrel among themselves. I have seen two individuals fighting in the field, all the while keeping up a constant stridulation, but neither one appeared to be at all injured, they having merely pulled one another about a little. There is a small form that has generally been included in this species. What Dr. Fitch calls the "fiddle bow nerve" in the tegmina is differently shaped from the preceding, the ovipositor is shorter (4 to 5 mm. long), and the stridulation a continuous rolling whir, instead of the ordinary *creak, creak, creak.* However, further investigation may prove these characters unstable.

Anaxipha exigua, Say. August.

Staten Island appears to be the most north-eastern station for this insect so far reported. It is not uncommon in certain localities along the ditches in the salt meadows where the high tide bushes (*Iva frutescens*) grow. It clings from six inches to a foot up the stems and its song has a particular silvery tone.

Œcanthus niveus, Serville.
" **fasciatus**, Fitch.
" **angustipennis**, Fitch.
" **bipunctatus**, DeGeer.

These insects reach maturity in late June and in July. Concerning *angustipennis* and *fasciatus* there has been much question, but they are, I think, distinct from *niveus*. Their structure is not the same and their stridulation is different. That of *niveus* is a *beat*, *beat*, pulsating sound; that of *angustipennis*, a faint continuous whir lasting only about five seconds with an equal interval of rest, and that of *fasciatus*, a long and comparatively loud, continuous whir often lasting several minutes. In addition these insects are not often found inhabiting the same bushes and trees. Their nuptial attentions are amusing. I have seen the "slender *Œcanthus*" dovour its pupa skin after ariving at the perfect state.

LOCUSTIDÆ.

Ceuthophilus maculatus, Harris. Sept.
Cyrtophyllus concavus, Harris. Late July and Aug.
Amblycorypha oblongifolia, DeGeer. Aug.
" **rotundifolia**, Scudder. August 2nd.
Microcentrum retinervis, Burm. Aug.
Scudderia curvicauda, DeGeer. Aug. 6th.
Conocephalus ensiger, Harris. July 9th.
" **exilicanorus**, Davis. Aug.

This insect is plentiful along the salt water creeks in certain localities on the Island and its stridulation as well as its form resembles that of *ensiger* more than any other native *Conocephalus*. We cannot count with any accuracy in *ensiger* the number of times one wing is drawn over the other as indicated by the rise and subsidence in the song, but *exiliscanorus* is such a slow singer that this estimate can be easily made, one wing being rubbed on the other about 115 times in a minute. The species devours the heads of the meadow grass (*Spartina*) and it was while thus employed that I first observed the female insect. When describing the species (Canadian Entomologist, Vol. XIX, p. 56), only the males were mentioned, but it is sufficient to add that the ovipositor is 37 mm. in length.

Conocephalus dissimilis, Serv. August.
" **robustus**, Scudder. August.
Xiphidium fasciatum, DeGeer. August.
" **brevipenne**, Scudder.
" **vulgare**, Harris. July 8th.
" **concinnum**, Burm. July.
Thyreonotus dorsalis, Burm.
" **pachymerus**, Burm.

ACRIDIDÆ.

Pezotettix scudderi, Uhler. Aug.
Acridium alutaceum, Harris. Aug.
" **rubiginosum**, Harris. Aug.
" **americanum**, Drury.

I observed a large grass-hopper at Tottenville on May 6th, 1888, which. I think, belonged to this species, but it is more often seen in November and will, at such times, fly up into the trees to escape capture.

Melanoplus femoratus, Burm. July.
" **punctulatus**, Uhler. Sept. 21st.
" **collinus**, Scudder. Aug.
" **femur-rubrum**, DeGeer. July.
" **atlanis**, Riley. Aug.
Paroxya atlantica, Scudder. July.
Chlœaltis viridis, Scudder. July.
" **conspersa**, Harris. July.
Stenobothrus curtipennis, Harris. July.
" **maculipennis**, Scudder. July.
Arphia sulphurea, Fabricius.

What is considered as the Spring form arrives at maturity about the middle of May and a few survive to the middle of July. As early as August 7th winged examples of the Fall form may be found in sandy places, and by the middle of September they are numerous.

Chortophaga viridifasciata, DeGeer.

Spring brood from late April to July; late Summer brood from July to frost

Encoptolophus sordidus, Burm.
Hippiscus tuberculatus, P. de Beauvois. May. A few living until July.
Dissosteira carolina, Linn. June.
" **bollii**, Scudder. Sept.
" **collare**, Scudder. Aug. 7th.
Psinidia marmorata, Harris. Aug. 7th.
" **fenistralis**, Serville. Aug. 7th.
Trimerotropis maritima, Harris. July.
Tettix granulatus, Kirby. April to Sept. inclusive.
" **ornatus**, Say. April to Sept. inclusive.
Tettigidea lateralis, Say. April and May.
" **polymorpha**, Burm. April to Aug. inclusive.
Batrachidea cristata, Harris. April to Oct. inclusive.
" **carinata**, Scudder. April.

PHASMIDÆ.

Diapheromera femorata, Say. September.

BLATTIDÆ.

Ectobia germanica, Fabricius.
Periplaneta americana, Fabricius.
" **orientalis**, Linn.
Platamodes pennsylvanica, DeGeer. June.
" **unicolor**, Scudder. June.

FORFICULIDÆ.

Anisolabis maritima, Bou.

Notes on Water Beetles.

By C. H. Roberts.

The occasional finding of a single specimen of some so-called Western species in the East or South has been sometimes noted, and is easily accounted for. Like, for instance, the writer's taking a specimen of *Chrysobothris exesa* near the New York Central R. R. tracks in N. Y. City, which was undoubtedly conveyed there in a freight car or in lumber. But it is not usual to find such species in numbers nor continuously.

Bennington County, Vermont, has proved to me unique in this respect.

Three seasons ago I took a single specimen of *Cnemidotus callosus* there, and last season two specimens more were taken. I have also taken five specimens of *Deronectes striatellus*. Heretofore I have known these two only from the West and South-west.

I have also taken three examples of an undescribed species of *Hydroporus*, found previously, so far as I can learn, only at or near Washington, D. C.

Last, but not least remarkable, Dr. Horn has just determined for me, from the same locality, Manchester, Vt., *Limnebius piceus*, "known only from California!" Of this species I have taken twelve or fifteen specimens, and it can not therefore be *chance*, but is certainly remarkable distribution.

This locality has proved an Eldorado, as far as water beetles, in a broad sense, are concerned. I am a very busy man, unfortunately for my collection, and a short vacation during the Summer is about all the time I have to devote to collecting; yet in three seasons I have turned up *ninety-seven* species. My son, a mere lad, but an enthusiastic collector, captured during last season forty odd species, among them upwards of 250 specimens of *Cnemidotus edentulus*, so that I am rather "long" of that stock. *Parnidæ* are usually looked for upon sticks, bits of wood or bark, and under stones, &c., in *swift running streams*, but it has not been my experience to find them there exclusively. There is quite a body of water at Manchester, called Dead Pond, which apparently has neither inlet nor outlet, and is as still and *dead* as a pond can be. Here I find, each season, two or three species of *Elmis*, clinging to the stems of moss.

The moss also yields many of the smaller *Dytiscidæ*, &c. I have found a net made from common, though stout, cheese cloth best, as it drains easily and none of the small things escape. I have taken in a single haul, from a ditch not over eight inches deep, and barely wide enough to admit a net, literally hundreds of specimens; and they were not all *Bidessus affinis* and *Hydroporus undulatus* either. The ditch drains a spring-hole in a meadow. I have lately taken a great liking to this interesting group of Coleoptera, and the scarcity of good collections, or even of good series of the commoner species, amongst my friends has led me to write and show what can be done, even with little time at your disposal, by careful and persistent collecting.

S. LOWELL ELLIOT, Ph. D.

American Entomological Science has met with a great loss in the death of Mr. Samuel Lowell Elliot, who died, February 12, 1889, aged 45, at his home in Brooklyn, from nervous prostration after a brief illness. Of delicate constitution, having been an invalid the latter part of his life, he devoted for many years past, when health permitted, all his time to the collection and rearing of Lepidoptera, in which he met with wonderful success. Inheriting unusual inventive talent, and possessing keen perceptive faculties, he collected great numbers of the rarer caterpillars, carrying them through their different stages with great success. With rare ingenuity he devised breeding cages and showed great skill and tact in caring for the larvæ and in contriving boxes for hibernating both larvæ and pupæ. He was especially successful in his apparatus for receiving the insects as they emerged from the chrysalis, so that their wings always developed well. Thus he would rear hundreds and thousands of *Bombycidæ*; his devices for mating them and securing the eggs of many rarer species showing great patience and sagacity. The result was that he bred the most perfect specimens of our rarer species of Butterflies, *Sphingidæ* and *Bombycidæ* by the thousand. Of the *Cochlidæ*, for example, he had raised twenty species, comprising large suites of specimens forming entire broods. There is probably no such collection in this country of such suites of perfectly preserved specimens. The moment the moths issued from their cocoons, when their wings were fully expanded he would watch for them, and before they had flapped their wings so as to disturb the scales, would poison them, and transfer them to the setting-board.

Had his life been spared, and had he had more strength, he would have amassed a collection unique in showing the variation of species. Unfortunately Mr. Elliot did not take notes or make full descriptions of the early stages, but the writer can testify as to his generosity in allowing others to use for study his rich material, and to his hospitality. Mr. Elliot was a born collector rather than a student; he had wonderful keenness of vision and perseverance in detecting larvæ; he was also a collector of books, of which within a period of five years he had amassed a collection of Americana including Natural History, and Agricultural Reports, forming a collection of 10,000 volumes. His house, from cellar to attic, was filled with books. One spare room was filled with rearing apparatus, on which he spent thousands of dollars. Had he been permitted to live, the results to the higher study of Lepidoptera would have been marked.

Mr. Elliot was modest, retiring, unselfish, freely opened his treasures in Entomology and the rarities of his library, to those whom he thought would appreciate them. He leaves a widow who keenly sympathized with him in his pursuits and possesses the same sharp eye for rare insects, and his fondness for Natural Science.

A. S. Packard.

At a regular monthly meeting of the Brooklyn Entomological Society, held on March 5th, 1880, the death of Mr. Elliot, an active member of the Society, on February 12th. in the City of Brooklyn, was announced and Messrs. Pearsall and Weeks were appointed a Committee to prepare the following brief memorial concerning him for insertion in the Society Publication and upon the minutes.

Mr. Elliot was born at Plattsburg, N. Y., and was the only son of Dr. William H. Elliot, the inventor, from whom he inherited much of his readiness of resource and enthusiasm in the prosecution of his chosen pursuits. Though for many years almost an invalid and at times a great sufferer from pulmonary affection, his extraordinary will-power seemed to rise superior to his physical weaknesses and urge him to exertions from which those of more robust constitutions might well shrink ; nor did he ever permit considerations of health or personal convenience to interfere with his self-allotted tasks, however arduous.

He was an ardent entomologist and especially interested himself in breeding and rearing local Lepidoptera, which he did upon an extensive scale and with distinguished success and in addition devised many novel and excellent methods of developing and preserving insects in every stage. It is to be regretted that his excellent practical knowledge of the habits and food plants of Lepidoptera together with the results of his experiments were not reduced to writing by him and published for the benefit of Science.

His abounding enthusiasm and energy have not been without their effect however, and have done much toward establishing a standard of careful manipulation and perfection of specimens and particularly the principle of tracing varieties by rearing from a parent stock—an example which cannot be too highly commended to our fabricators of nomenclature.

For several years past his efforts have also been directed toward the formation of a scientific library, which at the time of his death already consisted of some 10,000 volumes, many of them very rare and of much value.

He was an active member of many of our leading scientific societies, and shortly before his death had conferred upon him the degree of Doctor of Philosophy by the Faculty of Union College in recognition of his eminent and unwearying zeal in scientific work.

The members of this Society desire to express their sincere regret at the premature termination of a life so earnest in its aims and so conscientiously devoted to the advancement of Science.

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ASST. EDITOR:
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ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, MAY, 1889. NO. 5.

Phragmatobia assimilans, *Walker.*

By Annie Trumbull Slosson.

Mr. Henry Edwards, in his preface to the supplement to "New Check List" (Ento. Amer., March, 1888), in speaking of Walker's types in the British Museum, says: "It is probable that a few of the species mentioned may yet await re discovery by our entomologists, and that they are fully entitled to a position in our lists."

I feel confident that I have reclaimed, from the doubt and suspicion long surrounding it, one of these species, and can prove its right to the place in our lists given it by Mr. Edwards.

Last May I took at light in Franconia, N. H., on a cool evening towards the last of the month, a *Bombyx* which puzzled me greatly. It was much like *Phragmatobia rubricosa*, Harris, but a good deal larger, and differing in other respects. Still I thought, at first, that it might be a large female of an early brood.

On my return to New York in the Autumn I showed the insect to several entomologists, but it was new to all. One day, during the winter, in glancing over Mr. Edwards' supplement I saw the name of *P. assimilans*, Walk., and began to wonder if my moth might not be this long sought species. The supplement refers to "Cat. B. Mus., *pl. 3*, p. 630." I wrote to Mr. Edwards in regard to this and was told that the reference to "plate" was an error and should be "*part 3.*" I could find but little literature on the subject. In Morris's Synopsis is given this extract from Cat. B. Mus.

"**P. assimilans,** Walk. *Male.*—Red. Antennæ, testaceous. Thorax with brown hairs. Wings red, veins darker. Primaries slightly brown along the costa, and elsewhere indistinctly sprinkled with pale brown, with two blackish dots. Secondaries brighter red, with three black dots, two in disk, and one near hind border towards inner angle. Length of body 6 lines, of wings 16 lines. *Var.*—Primaries almost wholly brown. Secondaries with broad blackish submarginal stripe. United States."

Now my moth answers in every detail to first description, except that it is a female and larger, being more than 18 lines in extent. The dots are obscure, but their traces may be seen. In "Notes of N. Am. Lepidoptera in B. Mus. and described by Walker," Grote and Robinson (Trans. Am. Ento. Soc., Vol. II, p. 72) I find the following allusion to the moth in question.

"*P. assimilans.* The two specimens (a. b.) differ from *rubricosa* and *fuliginosa*, by their greater expanse and differently shaped primaries. These are more produced at apices, below which the extreme margin is sinuate, not rounded. We have seen no specimens of this species in any collection in United States."

Mr. Hy. Edwards, in a brief note made on a visit to British Museum in 1888, says of the types: "Looks like a large specimen of *rubricosa*, but one example has no spots."

I have shown my moth to Mr. Edwards, who agrees with me, that it is Walker's species, but thinks it should be placed in a different genus from *rubricosa*, perhaps *Antarctia*. This I am not competent to decide, and shall leave to wiser heads.

◆

We noticed recently in some German periodical, a method of relaxing Lepidoptera that might merit trial. The writer used a shallow vessel with a tight fitting lid, covered the bottom with alcohol sufficient to float the cork containing his specimens and left them for a time. It is asserted that they relax rapidly and very completely, that the colors of even the most delicate species is absolutely unaffected —that specimens never become wet, dirty, or mouldy, and that while the relaxation is very complete the setting takes place very quickly and firmly, and the specimens can be removed, much sooner than if relaxed by moisture derived from water. The current methods leave something to be desired, and perhaps this will fill the "long felt want."

* * *

By the time this number reaches our readers, *Lachnosterna* will be on the wing. Will not all Coleopterists collect them largely this season, and send us lists of their captures? If there be a question of identification, we shall be glad to attend to that.

Descriptions of New Species of Mexican HETEROCERA.

By Wm. Schaus, Jr.

The following species were all captured by myself in the State of Vera Cruz, Mexico, and the types are in my own collection.

Family AGARISTIDÆ.

Pseudalypia stuartii, n. sp. Primaries brown-black; a streak of metallic blue scales between the median and submedian veins, and a small spot of the same at the end of the cell, beyond which a narrow white band crosses the wing from close to the costal margin to near the internal angle; at each extremity this branch turns abruptly inwards, forming a sharp hook; fringe brown. Secondaries blue-black; fringe brown. Underneath brown-black with the transverse band on the primaries repeated as above. Head and thorax brown. Tegulæ orange. Body blue-black. Legs brown.

Expanse, 38 mm. 1 ♂. Paso de San Juan.

This species is very closely allied to *Pseudalypia walkeri*, recently described by Mr. Druce, and found at Acapulco.

Subfamily EUDRIINÆ.

Leisoma juanita, n. sp. Primaries above brown, powdered with bluish atoms especially along outer margin. An elongated, irregular, olive-green space extends from base of wings and nearly touches the costal margin at a third from apex; this space is separated from the ground color towards the inner and outer margins by a band of very dark brown, at the end of the cell is a small bluish crescent. Apex broadly white bordered internally by a broken band of dark brown; a series of small brown spots along the outer margin; fringe white at apex, brown otherwise. Secondaries above brown-black with fringe white, except on inner margin where it is brown. Underside of wings brown-black without markings; the apex of primaries white, and the outer margin thickly powdered with white scales. Head and thorax brown with bluish atoms. Ocellus white. Antennæ brown, white at the base. Body brown-black with a large orange spot on either side. Legs brown, powdered with bluish scales.

Expanse, 46 mm. 1 ♀. Paso de San Juan.

Found in thick forest.

Family ZYGÆNIDÆ.

Subfamily PHÆUDINÆ.

Harrisina mexicana, n. sp. Very similar to *americana* of Harris, but much smaller than any specimens I possess of that species. Entirely dull black with the secondaries semi-transparent. The antennæ are also much more deeply pectinated than in the above mentioned species.

Expanse, 18 mm. 1 ♂. Paso de San Juan.

This species is also allied to *Harrisina guatemalena* of Druce.

Lycomorpha teos, n. sp. Primaries above light brown, yellowish along the costal margin for two-thirds; a very narrow black margin from middle of costa to the apex where it becomes slightly wider and continues so to the internal angle, where again it becomes very narrow along the internal margin. Secondaries dull orange with a narrow black margin. Underneath entirely dull orange with black margins as above. Antennæ, head, thorax and body black; collar orange.

Expanse, 22 mm. 1 ♂. Barranca of Simalohuacan, State of Vera Cruz. Elevation, 7,000 feet.

Lycomorpha regia, n. sp. Primaries bright orange, along costa a very narrow black margin which becomes wider towards the apex, and continues wide to internal angle. At the apex the black margin is bordered inwardly with pale yellow. Fringe very conspicuous, white. Secondaries the same color as primaries, very broadly bordered with black at the apex, and diminishing rapidly to middle of external margin where it ceases; the fringe bordering this portion is white, but on the rest of the outer margin and also along the internal margin the fringe is orange. Underneath the wings are orange, broadly black at apices. Head white with a black spot on frons. Thorax and body above orange, underneath white. Antennæ black. Legs black on their upper side, white underneath.

Expanse, 28 mm. 1 ♀. Jalapa.

A marvellously pretty species.

SUBFAMILY EUCHROMIINÆ.

Macrocneme cinyras, n. sp. Primaries for two-thirds from base metallic blue-green, except a narrow black space extending from the internal margin close to the base of wings, towards the apices; primaries otherwise dull black with two white spots at the base of wings. Secondaries dull black with a few metallic green scales clustered near the center of outer margin. Wings underneath brown-black, metallic green on costal margins for half their length. Antennæ black tipped with white. Head black. Thorax green-black. Abdomen dull golden green with two white spots underneath. Legs brown-black. Tibia and tarsus thickly clothed with long black scales.

Expanse, 33 mm. 1 ♂. Coatepec.

Callicarus laciades, n. sp. The primaries and secondaries uniform dull black, a few minute metallic spots at the base of the primaries. Antennæ black, tipped with white. Head black; frons metallic blue. Collar and thorax black, spotted with blue. Abdomen black with a dorsal and a lateral row of metallic spots. In the male there are a few orange scales on anus. Legs black; tarsus tipped with orange.

Expanse, 30 mm. 1 ♂, 3 ♀♀. Paso de San Juan and Coatepec.

This species is very closely allied to *Callicarus laconia*, Druce, and also to the following species.

Callicarus misitra, n. sp. Very similar to *Callicarus laciades*, and only differs in having the wings slightly transparent, and behind the head are two small but conspicuous orange spots.

Expanse, 30 mm. 1 ♂. Paso de San Juan.

Callicarus jalapensis, n. sp. Head, thorax, abdomen, legs and wings dark brown, the primaries darkest at the base and becoming paler towards the apex. At the base of primaries is a small violet spot. Tarsus pale yellow.

Expanse, 40 mm. 1 ♀. Jalapa.

Cosmosoma aleus, n. sp. Male.—Primaries hyaline white; the veins, outer borders, apices, and a large space extending from the internal angle to the discal cell, and also a spot at the end of the cell, brown-black. The costal and internal areas to near apex and internal angle, also the base of wings dull orange. Secondaries white, hyaline, orange at base; the costal margin narrowly brown-black, the outer margin very broadly so. Underneath the markings are repeated as on upper side; costal margin of primaries narrowly yellow; on costal margin of secondaries a broad yellow space, and also yellow at the base. Antennæ black, tipped with white. Head and thorax black, spotted with blue; two orange spots on collar; tegulæ streaked with dull orange. Abdomen black with two dorsal and a lateral row of metallic blue spots. The female differs in having only a small dark space at the internal angle of the primaries, so that the space between the third and fourth nervules of the median vein is hyaline and not opaque as in the male. The border on the outer margin of the secondaries is also much narrower than in the male.

Expanse, 26 to 31 mm. Paso de San Juan.

This species is very abundant amongst low shrubs on the outskirts of the forest, and was found in large numbers flying with *C. auge*, *C. cingulatum* and *C. impar*.

Dycladia pyrrha, n. sp. Wings hyaline white with a narrow black border, which is widest at the apices of the primaries. On the costal margin at the base of primaries there are a few orange scales. Underneath the same as above; yellowish at the base of the wings. Antennæ black with a white circle near their tips. Head, abdomen and legs dull black. Thorax and tegulæ bright orange.

Expanse, 19 mm. 1 ♂. Paso de San Juan.

FAMILY ARCTIIDÆ.

SUBFAMILY CHARIDEINÆ.

Aclytia lucania, n. sp. Primaries dull brown. Secondaries whitish hyaline with the apices and outer margins black, especially broad at the anal angle. Underneath the same as above. Antennæ, head and thorax dull brown; two small yellow spots at the base of the tegulæ. Abdomen dorsally and laterally with three rows of metallic blue spots. Underneath abomen yellow.

Expanse, 36 mm. 1 ♀. Coatepec.

Aclytia superba, n. sp. Primaries glossy black, with a darker velvety blotch near the apex, and two indistinct bands of the same character extending from the cell to the inner margin. Secondaries semitransparent white with a black spot at the end of the cell, and a very broad black border to the apices and outer margins. Antennæ, head and thorax black. Abdomen above with the entire first segment, and the dorsal portion of the second segment black; otherwise bright red with narrow black transverse bands between each segment. Abdomen underneath black. Legs black; fore femora bright red.

Expanse, 47 mm. 1 ♀. Coatepec.

Heluira ælia, n. sp. Primaries dull brown and apparently slightly transparent so that all the veins and nervules are distinctly marked in a darker shade of brown. Base of wings, a spot at the end of the cell, the apices, the outer margins and a blotch at the internal angle also of a darker shade. Secondaries whitish towards the base, otherwise brown-black; a tuft of white hairs in anal fold. Wings underneath dull black with all the veins and nervules distinctly showing. Antennæ black. Head brown with two bright red spots behind the antennæ. Thorax brown, underneath a crimson spot. Abdomen dorsally metallic blue, with narrow black transverse bands between the segments, and a tuft of long brown hairs dorsally on first three segments. On abdomen underneath a large white spot.

Expanse, 30 mm. 1 ♂. Paso de San Juan.

Automolis nabdalsa, n. sp. Primaries with a broad, central, longitudinal band chrome yellow, otherwise light brown with all the veins and nervules yellowish. Secondaries with a wide dark brown marginal band extending from apex to anal angle, where it is broadest. Underside similar to upper. Antennæ brown. Head yellow with a small metallic spot on the frons. Thorax yellow. Abdomen above yellow, last three segments black, spotted with metallic blue. Abdomen underneath yellow. Legs yellow, brownish at base. Fore femora metallic blue.

Fxpanse, 40 mm. 1 ♀. Paso de San Juan.

Bears a certain resemblance to *Eucyrta prætexta* of Felder.

Automolis orbona, n. sp. Wings entirely bright yellow, the apices of primaries faintly tipped with brown, and an indistinct small brown spot on outer margin below apex. Secondaries with the outer margin narrowly and faintly bordered with brown. Underside similar to upper, but with the costal margin of primaries slightly darker. Antennæ brown. Head brown; a metallic spot on frons. Thorax yellow above; underneath brown with metallic blue spots. Abdomen yellow, the last three segments black, spotted with blue; laterally a row of blue spots.

Expanse, 30 mm. 2 ♂♂. Paso de San Juan.

Automolis parma, n. sp. Primaries orange, a small transverse white spot at apex, narrowly bordered with a dull brown band, which on inner side however does not quite reach the costal margin; outer margin bordered by a very narrow brown line; fringes ochreous. Secondaries pale ochreous, anal angle and a tapering border on outer margin brown-black. Underside the same as upper, but the border on secondaries is much narrower. Head, thorax and first segments of abdomen above bright orange, the remainder of abdomen black with a dorsal and a lateral row of metallic blue spots. Body underneath orange, the abdomen banded with black. Legs yellowish with longitudinal black lines.

Expanse, 31 mm. 1 ♂. Paso de San Juan.

This species is very similar to *A. contraria* of Walker, and differs chiefly in the narrower outer margin of the primaries and in the position of the white apical spot.

Preparatory Stages of Janassa lignicolor, *Walker.*

By Harrison G. Dyar.

Egg.—Globular and smooth. (The eggs were hatched when found, only the shell remaining.)

First larval stage.—Pale brownish yellow. The head, the hump on joint 5, and a dorsal line on the anterior segments, of a more distinctly brownish shade. Anal feet partly aborted.

Second larval stage.—Head slightly notched on top ; yellowish, marked with two brown bands. Body yellowish. Humps on joints 5 and 12 brownish, as is also the semi-obsolete dorsal line.

Third larval stage—The markings of the mature larva now begin to be assumed. Head brownish, with four confluent round whitish spots in front, the mouth parts and mottlings on each side of the band also white. The body is pale brownish with three large dark green patches, two on each side of joints 3 and 4, as in *Cœlodasys unicornis*, and the third, a dorsal patch, on joints 11 and 12. Black shades on the sides of joints 6 and 7, and on the dorsum on 8, 9 and 10. A white spot at the spiracles on joint 11.

Fourth larval stage.—The dorsal green patch extends on joints 9 and 10, inclosing an oblong brown space. Black shades laterally on joints 5, 6 and 7, and dorsally on 8. Several white spots at the spiracles of joint 11.

Fifth larval stage.—Mature larva. Head, elliptical, with a depression at the summit, smooth. A hump on joint 5, prolonged upward and backward and terminating in two points, tipped with white. A pointed elevation on joint 12. Anal feet partly aborted, as in allied genera. Head whitish, with two mottled yellowish and brown bands, dentate inwardly, dividing the ground color in front into white spots ; two near the vertex, two rounded near the center, and the mouth parts and the space immediately above them, white. Similar markings occur on the sides of the head, the ground color being divided into about six partly confluent white spots by brownish mottlings. Body, pale whitish, mottled with brown, much more heavily dorsally. A large dark green patch on each side of the anterior segments, bordered with brown, this border continued backward ventrally on joints 5 and 6, to joint 7. On the dorsum is another large dark green patch, beginning on joint 8 in two points, inclosing a patch of the ground color on joint 10, extending down on the sides at this segment, and ending abruptly at the end of joint 12. It is bordered with brown on joints 8, 9 and 10. The hump on joint 5 is shaded with dark brown, and there is a black patch on each side of joint 7 ; but this last marking is, in some cases, more or less obsolete. The spiracles on joint 11 are surrounded by a circular row of white spots, while the spiracles on joint 12 are black. Abdominal feet, whitish, with a brown line above the claspers, the line on joint 10 darkest.

Cocoon.—Tough and parchment-like, semi-transparent, similar to that of *Cœlodasys unicornis*. After forming its cocoon the larva fades to a nearly uniform whitish color, and the change to pupa does not occur till about a month before the emergency of the imago in the Spring.

Pupa.—Shining, light reddish brown, appearing somewhat darker between the segments ; minutely, but sparsely punctured. At the posterior edge of the thorax is a row of granular, square elevations, extending across in a curved line between the wing cases. Last segment furnished with two small divergent points.

Food plant.—White Oak (*Quercus alba*). During the first two larval stages the insects eat only the upper portion of the leaf, and their yellowish brown color well simulates its withered appearance. Subsequently they devour the entire leaf with the exception of the largest veins, and rest on its edge, where they might be mistaken for a curled and discolored portion.

Five eggs were deposited together in the present instance; but the larvæ feed singly.

I have seen no description of the female moth. It differs from the male as follows: It is larger, the antennæ are not pectinated, and the external margin of the primaries is slightly excavated between the veins for its lower half. In coloration it much resembles the male; but the "ochreous tinge" of the primaries below the median vein spoken of by Dr. Packard (Proc. Ent. Soc. Phil., Vol. III, p. 367) is not to be seen. The secondaries are tinged with cinereous for their outer third.

Larvæ from Dutchess County, New York.

PROF. C. V. RILEY is in Europe, representing the U. S. Dep't of Agriculture at the Paris Exposition.

* * *

PROF. C. H. FERNALD goes to Europe this Summer, and will study all accessible types of *Pyralidæ*. It is not a particularly creditable fact to America that her entomologists must travel to a foreign country to study American types—not ancient alone, but quite recent. The time ought really be now at hand when American entomologists should have a monopoly of describing American species, and should be able to find room for their types in this country. I am a believer in "Protection to Home Industries," and I believe there is plenty of room in our museums to hold all the types to be deposited there for some years to come.

* * *

SUPPOSE each collector during the coming season notes down some of the observations made by him concerning the habits of the insects he collects, and gives them to his fellow collectors through the medium of ENTOMOLOGICA AMERICANA! It would help all hands, including the editor, for then there would be no dearth of the most valuable kind of manuscript.

SOME NEW SPECIES OF LACHNOSTERNA.

By John B. Smith.

For more than a year I have been, during odd moments, studying the species of *Lachnosterna*, more especially with the aim of bringing out prominently the remarkable sexual characters of the species—characters which shed so strong a light on specific relationships that their study can not be much longer neglected. Not the male only, but the female as well, show excellent and sharply defined characters which place species upon a much more solid foundation than heretofore possible by a study of external structure merely—structures which are all more or less variable, and which allow too much latitude to individual opinion. The sexual characters within my experience are absolutely invariable—there is no "more" or "less," but they are practically identical, and equally constant in both sexes. Where any difference appears, it is indicative of a distinct species, though on the other hand I am not prepared to say that identity of sexual structure in all cases indicates identity of species. It would do so in *Lachnosterna*, in my opinion. These studies on the sexual characters of *Lachnosterna* are now completed, and I have figured 87 of the species in 265 figures The paper is ready for the printer, and will appear in due course in the Proceedings of the United States Nat'l Museum. As there is usually considerable delay in the printing of these Proceedings, I prefer to describe the new species now, to call attention to them during the present season. In "Insect Life," No. 6, I have already described four species, usually combined under the term *fusca*, another of these forms has come into my hands, equally deserving specific recognition.

L. insperata, sp. nov.

Agrees very completely with Dr. Horn's description of *fusca*, and superficially no obvious differences are apparent. The ventral characters of the male resemble those of *dubia* and *arcuata*, the ridge being strongly arched and small, but situated back from the posterior margin of the penultimate segment and not overhanging the last. In the female I have found no distinctive characters. Six specimens, taken under stones early in Spring by Mr. M. L. Linell, at Snake Hill, N. J., are before me—4 of them males, 2 females. The specimens are dark in color, and large and stout, resembling most nearly the larger form of *fusca*, which occurs with it. The male is readily recognizable, and I picked out the species immediately from a mixture of other specimens. The sexual structures bear out perfectly the position assigned, which is between *arcuata* Smith, and *dubia* Smith.

L. ulkei, sp. nov.

Form robust, ovate, rufocastaneous, shining. Clypeus slightly emarginate, the border moderately reflexed, surface rather closely punctate. Thorax widest at base, arcuately narrowed to the apex, margin indistinctly crenulated, with short ciliæ, surface distinctly but very irregularly and not very closely punctured, with a smooth median line. Elytra more deeply and densely, somewhat confluently punctured, the costæ evident. Pygidium rather finely and sparsely punctate. Metasternum densely punctured, the hair long and dense. Abdomen shining, sparsely punctate. Claws curved, the tooth median, stronger in the female. Last joint of the maxillary palpi ovate, not impressed. Length .85 inch = 21—22 mm.

Habitat—So. Car. (Ulke), Georgia (Ulke), Tenn. (U. S. N. Mus.), E. Florida (Ashmead). 3 ♂♂, 1 ♀.

MALE.—Antennal club as long as the stem. Abdomen flattened at middle, penultimate segment with a perfectly straight, feebly elevated ridge, behind which the segment is strongly depressed, making the declivity deep and abrupt without any great elevation of the surface of the ridge. The ridge is close to the margin of the segment, and in the Tennessee specimen almost coincident with it. Last ventral feebly concave. Inner spur of the hind tibia two-thirds the length of the outer and stouter.

FEMALE.—Antennal club small, much shorter than the funiculus. Last ventral segment feebly emarginate at apex. Pygidium more elongate than in the male, more shining, the punctures more deeply impressed.

This species agrees in all essentials and group characters with *fusca*, and with that species it has been confounded. The four specimens before me are very uniform in appearance, and chiefly differ habitally, in the paler color and the much more rugose appearance, the punctuation being coarser throughout. The lateral margin ef the thorax is also very feebly crenulated, yet not so as to throw the species into another group. The ventral character of the male gives an obvious and safe distinguishing feature for that sex. In the female the somewhat broader, more oval form and the coarser punctuation must suffice if the genitalia be not examined.

L. quadrata, sp. nov.

Form oblong, parallel, rather deep brown, shining. Clypeus very feebly emarginate, moderately reflexed, surface coarsely and rather sparsely punctured, front more closely and more deeply punctured. Thorax widest at base, arcuately but not very greatly narrowed to the apex, margin entire, with short ciliæ, surface rather sparsely and irregularly punctate, without an obvious smooth median line. Elytra closely and confluently punctured, the punctures tending to form longitudinal series, costæ obvious but not much elevated. Pygidium sparsely and finely punctate, the last two segments more coarsely. Claws curved, the tooth strong and median. Last joint of maxillary palpi ovate, not impressed. Length .87 inch = 22 mm.

Habitat—Enterprise, Florida, May.

MALE.—Unknown.

FEMALE.—Antennal club small, much shorter than the funiculus. Last ventral segment broadly emarginate at apex.

This species is based upon a single specimen taken by Mr. Schwarz, and now in his collection. It is evidently related to *fusca*, and agrees with it in all structural details. It is however well distinguished by the almost square clypeus, the punctuation of the head and elytra, and by the curiously parallel form. The genitalia are strongly characteristic and distinct.

L. nova, sp. nov.

Oblong, slightly broader behind, chestnut brown, shining. Clypeus moderately emarginate, the border narrowly reflexed, surface densely and coarsely punctured, the front less densely so. Thorax gradually narrowed from base to apex, sides feebly arcuate, the margin distinctly crenate, surface with distinct irregular punctures, sparse on the disc, where there are irregular smooth spaces, more densely and equally placed at the sides. Elytral punctures finer than those of the thorax, much more closely placed, somewhat rugulose, the costæ feeble but evident. Pygidium sparsely, finely and indistinctly punctate. Metasternum densely punctured, the hair not long nor dense, shorter in the female. Abdomen sparsely punctate at the sides, the last two segments more coarsely. Claws curved, the tooth strong and median. Last joint of maxillary palpi fusiform, not impressed. Length, .55—.70 inch = 14—18 mm.

Habitat—N. Y., Dist. Col., N. C.

MALE.—Antennal club equal to or slightly longer than the funiculus. Abdomen slightly flattened at middle, penultimate segment with a distinct, arcuate, granulated ridge, behind which the segment is deeply impressed and punctured. Last segment with a cupuliform depression. Inner spur of hind tibia shorter.

FEMALE.—Antennal club shorter than the funiculus. Penultimate segment with a linear impression close to and parallel with the hind margin. Hind tarsi slightly shorter than the male.

This species is not uncommon at Washington, and has been very generally confounded with *fraterna* and *forsteri*, with which it agrees in all group characters. Apart from the primary differences in the male genitalia, this sex is always easily recognizable by the distinct arcuate ridge of the penultimate and cupuliform depression of the last segment. The same character is sometimes approached in the *var. forsteri* but is never so distinct. The thoracic margin in both sexes is more distinctly crenate, though this too is indicated in some specimens of *fraterna*.

L. hornii, sp. nov.

Oblong oval, not broader behind, convex, very deep-brown or piceous, shining. Clypeus moderately deeply emarginate, rather more acutely in the female, margin narrowly reflexed, rather coarsely densely punctured, front scarcely less densely punctured. Thorax distinctly narrower in front, sides very obtusely angulate, widest behind the middle, narrowed to base, more obliquely narrowed in front, margin feebly crenate, sparsely ciliate, disc convex, the punctures moderately coarse, variably placed, sometimes closely and equally, sometimes sparsely and irregularly on the disc, leaving smooth spaces, but no smooth median line ; a distinct depression of the basal margin externally. Elytral punctures finer, much more dense, somewhat rugulose, costæ evident. Pygidium moderately and somewhat irregularly punctured, less densely so in the female. Metasternum densely punctured, the hair long and dense in the male, short and sparse in the female. Abdomen finely punctate, more dense at the sides, the last two segments much more coarsely and densely punctate. Last joint of maxillary palpi fusiform, not impressed. Length .75—.85 inch = 19 to 21 mm.

Habitat—Washington, D. C., Tennessee, Virginia, Ohio.

MALE.—Antennal club slightly longer than the funiculus. Penultimate segment with a very strongly elevated, overhanging arcuated crest, occupying nearly the entire length of the segment, behind which there is a deep, transverse, punctured impression. In some specimens the crest is divided at the middle, and a longitudinal impression extends forward to the middle of the preceding segment. Last ventral with a quadrate, punctured impression, the hind margin with a small deep emargination. Claws arcuate, tooth rather extra median, shorter than in the female. The fixed spur is quite short, less than half the length of the outer, and proportionately less stout.

FEMALE.—Antennal club shorter than the funiculus. Pygidium more elongate, the punctures smaller and more sparse. Posterior femora stouter, spurs of hind tibiæ short and stout. Penultimate ventral segment with a strongly impressed line near the hind margin, behind which the segment is depressed. Last ventral segment sinuate at apex, scarcely emarginate. Tarsi not shorter than in the male.

Variations.—In a series of nine specimens no variations are observed. The species is remarkably constant in form and color.

About a dozen specimens of this interesting form were taken at Washington during the season of 1888. None of the local collectors had ever taken it before, and it was but sparingly taken among the hundreds of other specimens. Mr. Schwarz received a single male specimen from the mountains of Tennessee, Mr. Alwood saw a specimen in a local collection in Virginia, and I saw several specimens in Mr. Dury's collection at Cincinnati, Ohio. The species is therefore probably widely distributed, though rare.

In group characters it would seem at first referable to the *fraterna* section of the group, but the large size, very long tarsi, and the marked sexual characters refer it rather with *rugosa* and allies, though the thorax is not evidently angulated, and the punctures not nearly so coarse. In the short spur of the male it resembles *infidelis* while the distinct elytral costæ, as well as the ventral characters of the male, make it abundantly distinct.

I take pleasure in dedicating this strongly marked species to my good friend and mentor, Dr. Horn.

L. biimpressa, sp. nov.

Oblong, scarcely ovate, pale reddish-brown, shining. Clypeus moderately deeply emarginate, margin narrowly reflexed, densely and rather coarsely punctured, as is also the front. Thorax distinctly narrower in front, sides obtusely angulate, widest at middle, narrowed to base, more obliquely narrowed in front, margin irregular, scarcely crenate, sparsely ciliate, disc convex, the punctures coarse and rather closely placed, a distinct smooth median line, a distinct impression of the basal margin externally, and a distinct foveate impression at each side, nearly opposite the angle. Elytral punctuation finer, more dense, somewhat rugulose; sutural costa distinct, the others feeble. Metasternum closely punctate, with moderately long hair. Pygidium rather sparsely, finely and irregularly punctured. Claws arcuate, with a strong median tooth. Last joint of maxillary palpi fusiform, not impressed. Length, .76 inch = 18 mm.

Habitat—Manhattan, Kansas.

MALE.—Antennal club nearly as long as the stem. Abdomen flattened at middle, sparsely finely punctate at the sides, the last two segments more coarsely. Penultimate ventral segment with a rather feebly elevated, strongly arcuated ridge, behind which the segment is deeply impressed and punctured; the last segment with a somewhat quadrate depression.

Only a single male specimen is known to me. I have placed it in the *rugosa* group, and associated it with *scitula*, though the specimen has very evidently but nine antennal joints on each side. Yet all the other characters of structure and habitus refer the species here, while it would be otherwise associated with entirely incongruous material. Under the circumstances I regard the 9 joints as accidental, and shall expect other specimens to show the typical 10 jointed form.

L. longispina, sp. nov.

Oblong, nearly parallel, ferruginous brown, feebly shining, sparsely clothed with yellowish, erect hairs, longer and more dense on the thorax, shorter on the elytra, where they form distinct rows on the costæ similar to those of *hirticula*. Head densely and coarsely punctured, with moderately long hair, clypeus emarginate, the border moderately reflexed. Thorax widest at middle, slightly narrowed at base, more at apex, the margin feebly crenate, ciliate, basal margin channelled externally, surface with coarse punctures moderately closely placed, with long erect hairs. Elytral punctures much finer than those of the thorax, less impressed, denser and somewhat rugulose, the hair sparser and shorter than on the thorax, the discal costæ not distinct, marked only by the rows of longer hair. Pygidium of male sparsely and not deeply punctate, not hairy. Metasternum densely punctured, the hairs yellow, long and dense. Claws arcuate, a strong acute median tooth. Length, .68 inch = 17 mm.

Habitat—South Carolina (Morrison), Grand Ledge, Mich., May 24th, (Schwarz).

MALE.—Antennal club a little longer than the stem. Abdomen slightly flattened at middle, the penultimate segment with a transverse, arcuate, rugulose elevation, behind which is a concavity. Last ventral flat. Inner spur of hind tibia fully as long and scarcely stronger than the outer.

FEMALE.—Wanting.

Three specimens of this form, which is perhaps confused with *hirsuta* (with which it agrees in group characters) in collections, are before me, all of them males. It is readily known by the almost equally long spurs of the male, and by the distinct lines of longer hair on the elytra. The thoracic margin is also evidently, if not strongly, crenulate.

L. innominata, sp. nov.

Oblong oval, convex, chestnut brown, shining. Clypeus moderately deeply, acutely emarginate, the border moderately reflexed, surface rather closely and coarsely punctate, front less densely and more coarsely punctate. Thorax, sides arcuate, narrowing rather regularly toward apex, the margin scarcely irregular, not crenate, with long ciliæ, the punctures small, sparse and irregularly placed, no median line, a distinct channel along the base externally. Punctures of the elytra more coarse and dense than those of thorax, the costæ evident, but not prominent. Pygidium sparsely indistinctly punctate. Metasternum punctate, the hair (♂) long and abundant. Abdomen indistinctly punctate at the sides, the last two segments more coarsely punctate. Claws arcuate, a long acute median tooth, smaller on anterior tarsi. Last joint of maxillary palpi fusiform. Length, .72 inch = 18 mm.

Habitat—Winona, Minn., U. S. N. Mus. Acc. 21542.

MALE.—Antennal club as long as the stem. Abdomen flattened and slightly concave at middle. Penultimate segment with a rather feeble, semicircular depression on each side of which is a short oblique tuberosity. Last segment transversely concave, almost cupuliform. Inner spur of hind tibia rather more than half the length of the outer, stout and straight.

FEMALE.—Unknown.

This species is known to me in a single male specimen only. It is intermediate in some respects between *implicita* and *balia*, yet abundantly distinct from either. The male characters are more like those of *implicita* save that the last segment is concave, but the very smooth, sparsely punctured thorax is distinctive. This species is also much larger than its immediate allies.

L. antennata, sp. nov.

This species is intermediate between *tristis* and *crinita*, while evidently distinct from both. It has the size, vestiture, and general habitus of *tristis*, but the smooth, shining surface of *crinita*. The female is recognizable by the shining surface, associated with the vestiture of *tristis*. The antennæ of the male have the club distinctly longer than the stem, and much longer than in *tristis*, without attaining the abnormal development of *crinita*. Size of *tristis*.

Habitat—Texas.

The collection of the U. S. Nat'l Museum contains a long series of males, and but a single female. There is no variation whatever, except a very slight one in size. The ventral characters are as in *tristis*. I have seen other specimens than those in the Museum Collection, and all are from Texas. It is probably common locally.

I shall be glad to name *Lachnosterna* for collectors for the privilege of keeping what may prove desirable for study.

Editorial Notes.

As will be noted from the first page of the cover, there has been a complete change of the editorial staff of Entomologica Americana. At the April meeting of the Society Mr. Hulst resigned his editorial position on the plea of lack of time to properly attend to the work, and insisted on his resignation notwithstanding the decided disinclination on the part of the Society to accept it. A unanimous vote of thanks for able manner in which he had conducted the Journal, was tendered Mr. Hulst. Mr. Roberts thereupon followed the example of Mr. Hulst, and on the same plea—business engagements—resigned his post as assistant, a resignation also reluctantly accepted. The choice of the Society for the vacant positions fell upon myself as editor, and Mr. F. H. Chittenden as assistant editor. Being again settled so near New York City as to be practically of it, I have accepted the office, and we are now back in the editorial chair, ready to poke advice or criticism at those who need or deserve it. The chair feels familiar, but it has grown since we were last in it, and our readers must indulge us a little, until we learn to fill it as well as our predecessor. As Mr. Hulst will continue to contribute as heretofore, and has promised us his assistance, we hope to satisfy all reasonable demands.

* * *

We have received Bulletin No. 1 of the Central Experiment Station at Washington, which contains some information of entomological interest which we will try to present to our readers in the next number.

Collecting Lachnosterna.

By C. H. Roberts.

As the season approaches for collecting this genus, I am induced to tell of a method which was new to me until last Spring, and which proved very remunerative. It was my good fortune to spend a couple of weeks in Washington, D. C., last May with that band of well-known entomologists and enthusiastic collectors, gathered there, and they initiated me—taught me the trick *i. e.*—beating.

Given a clump of Oak or Hickory trees (young ones preferred), situated near a lawn, meadow or pasture; an umbrella, beating stick, lantern, plenty of good sized bottles, charged with cyanide or chloroform, and if possible a companion, and you are ready—when night comes.

The beetles begin to emerge from the ground at about dusk and fly to the trees to feed.

As long as any light remains you can hand-pick them, but when it becomes dark, or if they appear in large numbers, you open your umbrella and the beating process begins. If the locality be a good one you will be astonished at the result. You want the lantern to examine the umbrella with, and your companion to hold it and the umbrella.

While in Washington four of us went out in this way and we took nearly *two quarts*, or almost a *thousand* specimens in an hour and a half. Six or seven species were represented. Oak and Hickory are of course not the only food plants, but seem to be favorites.

One species, *affinis*, was quite commonly taken upon an old oak which grew near my friend's house, and seemed to be rare everywhere else. *Affinis* suddenly disappeared after a few days, and then the pear trees in the garden were savagely attacked by *hirticula* and *fusca*, or rather *arcuata*, Smith, n. sp. It for some time seemed as if they would destroy the trees, so vast were their numbers; and I am not sure but that they would, were it not for the hand-picking of myself and friend.

After my leaving, my friends took many hundreds of specimens, and many species in this way.

Upon my return to New York I tried the same method in one of our small parks and succeeded very well, although the season was getting late. I was once disturbed by a gray-coated "guardian of the peace," but I finally *persuaded* him that he was wanted in another part of the park and the good work went on.

Collecting about electric lights, especially when they are near parks, and not too far from the ground, is productive of very good results, but beating goes beyond anything in my experience.

The beetles seem to fly mostly from dusk until ten o'clock, although some specimens have been taken as late as midnight.

NOTES UPON GRYLLUS AND ŒCANTHUS.

By Jerome McNeill, Moline, Ill.

The species of *Gryllidæ* are so variable that it is practically impossible to say at present how many good species there are in the United States or even what constitutes a single good specific character. The result is that a great many more species than exist have been described (Mr. Walker, for example, is credited by Saussure with having added eight synonyms to *G. assimilis* Fabr.,) and the habits of distinct but similar species have been confused. The latter conclusion has been forced upon me after several years observation and I venture to offer my solution of the difficulty in this paper. I do not hesitate to say however that I do not feel at all sure of the correctness of my position but if I succeed in calling the attention of other observers to this very interesting group, I shall be well paid for my trouble.

In speaking of the habits of these *Orthoptera*, a late writer on the subject, Mr. Lawrence Bruner, says: "Usually most of our North American *Grylli* live singly or in pairs in burrows which they dig for themselves. These are used as retreats during the day-time and serve as shelter during the ordinary inclemencies of the weather. These burrows are generally forsaken about midsummer for some sort of above ground shelter. From this time on until Fall they appear to be more social and live in colonies under various sorts of rubbish. Grain-shocks are a favorite haunt for them and since twine has been used for binding, the crickets have been quite troublesome by cutting the bands. During the late Summer and Fall the females commence preparations for the continuance of their kind, by thrusting their long slender ovipositors into the loose soil and dropping their eggs. These sometimes hatch the same year but as a rule lie over until the following Spring. The young generally live above ground where they hide among fallen leaves, grasses and other debris, though sometimes they also creep into chinks and crevices in the earth." If I am not mistaken the description just quoted applies to no single species. The burrow-making species is *G. pennsylvanicus* Burm., or, if this name is as Saussure believes only a synonym, *G. luctuosus* Serv. The social crickets are *G. abbreviatus* Serv., and *neglectus* Scud., which is probably a variety of Serville's species. Briefly recounted, the life history of *abbreviatus* is as follows: The eggs hatch in this latitude in July, and the first adults appear as early as the second week in August. During every stage of life they are social, feeding together, seeking shelter in company, and when egg-laying times comes, in October, the females collect by hundreds in some suitable locality, an abandoned or little used roadway suits them well, where they deposit their eggs, each female laying several hundred, in an irregular mass. After this duty is performed their business on this planet seems to be finished and they succumb to the increasing cold, none surving the Winter. The eggs do not hatch until the following July or if in rare cases they do hatch, the larvæ probably perish with cold. In Florida *Gryllus luctuosus* Serv., attains its growth in December. *Gryllus pennsylvanicus*, probably the short-winged form of *luctuosus*, is, so far as I know, not found in the Southern States, and in the Middle States it does not have time to complete its metamorphoses in the Fall, and consequently survives the Winter in the larval and pupal stages. In the Spring it soon completes its transformations and by the first of June its note is heard. They dig burrows and these they occupy probably as long as they live. During the months of June and July the meadows and pastures and especially the wood pastures are filled with the music of their song. Ordinarily in favorite haunts every square rod will contain at least one burrow and these burrows are of course frequently much more abundant. The males never seem to stray away from their homes in the day-time and are often found singing just within the entrance. Where their eggs are laid, or when, I have never been able to discover, but I have never seen the young before September, so that the eggs are probably laid about the time that *G. abbreviatus* Serv., are hatching. *Gryllus pennsylvanicus* Burm., is so far as I have observed never a social species, not even in the feeding stage. *Gryllus abbreviatus* Serv., are always social and never burrow-inhabiting, although it is very probable that they make occasional use of the burrows of their congeners. Mr. Scudder says in his "Distribution of Insects of New Hampshire,"—"At Jefferson in 1867 no chirp of a cricket was heard until Aug. 12, although they often commence their song in Massachusetts in June." If I am right this absence of the cricket serenade in New Hampshire during the months of June and July and early August is accounted for by the fact that this locality is north of the range of *G. pennsylvanicus*. This species has not been I think reported from Canada, and *Gryllus luctuosus* Serv., is rare, so that if I have not erred there should not be heard anything more than an occasional cricket chirp in that part of North America before the middle of August. It may be well to add in conclusion that the only invariable and easily recognized difference between the two species is that in the female of *G. pennsylvanicus* the ovipositor is decidedly shorter than the body, including the head; in *G. abbreviatus* this organ is nearly or quite as long as the insect itself.

There are five species of *Œcanthus*, or tree crickets, in the eastern part of the United States and these are widely distributed over North America. Two, *Œcanthus fasciatus* Fitch, and *Œcanthus angustipennis* Fitch, have generally been considered varieties of *Œcanthus niveus* De Geer, but two years observation of this genus has led me to conclude that they are quite distinct in structure, habits and song, and they must therefore rank as species. The last named species can be distinguished from the two former by its broader wing covers, the width of the dorsal field compared with the length being about one to two in *niveus*, as well as in *Œcanthus latipennis* Riley, one to three in *angustipennis*, and two to five in *fasciatus*. The average of these dimensions is in the first mentioned species .26 to .54 inches; in the second .30 to .62 inches; in the third .16 to .44 inches and in the last .18 to .46 inches. *Niveus* can usually be distinguished from all the other species by its color which is ivory white, with almost no perceptable infusion of green in the male but the elytra of the female may be quite decidedly green. In *angustipennis* the male as well as the female probably is deeply suffused with green. In *fasciatus* the greenish tint is also predominant in the wings and elytra, while the other parts of the insect vary in color from uniform deep black to ivory white varied with fuscous or black. In typically colored specimens however the head and pronotum are whitish with three distinct fuscous or black stripes extending, one over the top of the head and pronotum and the other two on the lateral lobes of the pronotum and upon the sides of the head. *Latipennis* differs in coloration distinctly from the two last mentioned species but only slightly from *niveus*. Like the latter its general color is ivory white with the elytra perfectly transparent, but it is distinct from *niveus* and the other two species in having the head and the basal half of the antennæ suffused with pink or light brown. It also lacks very generally if not always, the fuscous spots which are always found upon the lower face of the two basal joints of the antennæ. *Niveus* is farther distinguished from all other species by its proportionally longer maxillary palpi. This disproportion is most apparent in the ultimate joint which is not only relatively but actually longer than the same joint in *latipennis*, a decidedly larger insect. These dimensions are for the two species mentioned respectively: fifth joint 1.5 mm. and 1.4 mm; fourth joint 1.3 mm. and 1.3 mm.; third joint 1.6 mm. and 1.7 mm. Finally in *niveus* the outer, or fourth, curved oblique nerve at the base of the elytra is more angular than in any of the other species and consequently the space between the third and fourth nerves, which in the other species is about equal in width to the space between the first and second and the second and third, is in *niveus* much greater. In addition to the distinctions already mentioned, *fasciatus* has longer antennæ than the other species have, these organs being more than two and one-half times the length of the insect. It is also remarkable for having the longer series of spines at the tip of the posterior tibiæ very large, for this genus, strong and acute. The ovipositor of the female is also distinct from the perfectly straight ovipositor of *niveus* in being plainly turned up at the tip. Finally the maxillary palpi offer distinct specific characters in the proportionally short fourth joint and in the shape of the fifth joint which is subclavate instead of fusiform as in the other species. *Angustipennis* differs from the other forms in its small head and slender pronotum, which in the female, especially, is decidedly narrowed anteriorly, instead of being equal in width throughout as in the females of *niveus* and *latipennis*. The hind legs are also proportionally longer and more slender, and the post tibial apical spines are so weak as to be somewhat difficult to distinguish with the unaided eye. These species differ from one another in song as markedly as in structure. That of *niveus* is the well-known *trrr-ree, trrr-ree*, repeated without variation or pause sixty or seventy times in a minute. In the vicinity of Davenport this song is heard as early as the twenty-third of July and it continues until the persistent little singers are killed by the heavy frosts of late Fall. This song is heard only at night and occasionally on cloudy days but in the latter case it is only an isolated song and never the full chorus of the night-song whose vibrations in exact unison produce that "rhythmic beat" as Burroughs has happily phrased it, which is so characteristic. It is the effect of many united songs that has led the same author to speak of "purring crickets." Thoreau calls it the "slumbrous breathing" and the "intenser dream" of crickets, but Hawthorne has given it a still more spiritual interpretation. He describes it as "audible stillness," and declares that "if moonlight could be heard it would sound like that." Prof. C V. Riley says of the song of *latipennis* that it is continuous and recalls the trilling of a high-pitched dog-whistle in the distance." He also says "The commingled shrill of this species recalls also the distant croaking of frogs in the Spring." The song of *fasciatus* is also a high trill continuing usually for several minutes but the length of the note is very variable as is the interval between the notes. It sings all day as well as all night, in the bright sunshine as well as on cloudy days and in the dusk of evening. *Angustipennis* has a song which resembles that of *fasciatus* in some degree, but it is very much fainter and lasts only from three to five seconds with an equal interval between the trills. Mr. Scudder says* of the song of *niveus*: "The day-song of this insect is exceedingly shrill and may be represented by the following figure [a musical notation representing a trill] though the notes vary in rapidity. When slowest they are about sixteen to a second. The song is of varied length, sometimes lasting but two or three seconds, sometimes continuing a minute or two uninteruptedly; it is a nearly uniform equally sustained trill, but the insect often commences its note at a different pitch from the normal one as if it required a little practice to attain it. When singing the tegmina are raised at fully a right angle to the body. The night-song consists of *thrr* repeated incessantly, three parts of song and one of rest in every three seconds." The "day-song" described by Mr. Scudder seems to be the song of *fasciatus*, while the "night-song" is a good description of that of *angustipennis*. In conclusion *latipennis*, according to Prof. Riley, generally chooses the tender shoots of the grape in which to lay its eggs, while *niveus* prefers the raspberry or blackberry, but is much less particular than the first mentioned species and frequently lays its eggs in the tender twigs of several other shrubs and trees. Both of these species as well as *angustipennis* prefer cultivated ground, but *fasciatus* is comparatively rare in such localities but is abundant along weedy roadsides and hedges and in meadows overgrown with rank weeds. The females are abundant in late Summer and early Fall on the various species of *Solidago* and *Helianthus* particularly when these grow about the edges of meadows and cornfields. Walker's species *Œcanthus nigricornis* is, I think, nothing more than a long-winged dark variety of *fasciatus*. Specimens of the latter with wings extending beyond the elytra as much as .16 of an inch are not uncommon, and as Walker's description does not contain other plain characters his name should give way to the older one of Fitch. The last of the five species referred to at the beginning of this paper is *Œcanthus bipunctatus* DeGeer. It is at once distinguished from the other species of the genus by the lower margin of the lateral lobes which is emarginate in the middle instead of straight or slightly convex and by the spotted elytra. I am not acquainted with its song and it has never, I think, been described.

Society News.

Brooklyn Entomological Society.—*Feb. 5th, 1888.*—16 persons present. The Curators reported the arrangements for the Exhibition of specimens on February 14th. Mr. Weeks gave some notes on the methods of collecting *Rhynchophora* and on the food habits of several species. Mr. Jülich added notes on *Aphrastus tæniatus* and other species observed by him.—*March 5th, 1889.*—17 persons present. The Report of the Exhibition Committee was presented and adopted, and considerable discussion as to the cabinets and boxes to be adopted for the Society was had. A large mass of routine business was disposed of. The food and other habits of local *Cerambycidæ* were discussed by Messrs. Weeks, Dietz, Hulst, Angell and Meeske.

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* Boston Journal of Natural History, Vol. VII, No. IV, pp. 365 and 366.

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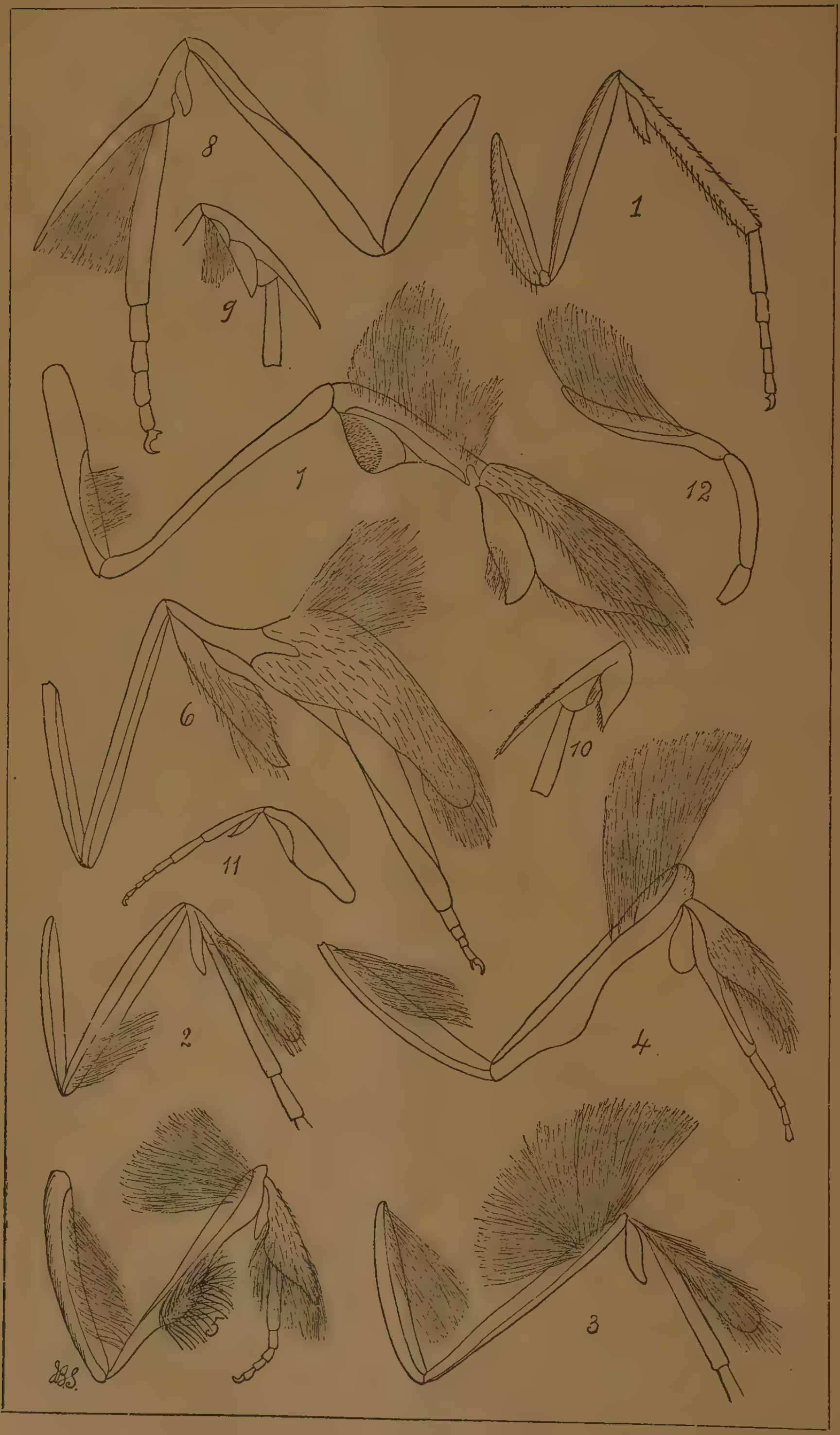

ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, JUNE, 1889. NO. 6.

CONTRIBUTIONS TOWARD A MONOGRAPH OF THE NOCTUIDÆ OF TEMPERATE NORTH AMERICA.

By John B. Smith.

It is now several years since I first began the study of the North American *Noctuidæ*, with the intention of eventually producing a monographic work on the species. In this intention I was encouraged by the assistance of Lepidopterists generally, and first began where I ought to have ended—with a critical review of the genera of our fauna. This was published in the Bulletin of the Brooklyn Entomological Society, and the work, crude at best, gained nothing from the fragmentary manner of publication. Yet the paper was a useful one, since we had nothing of the kind previously, and it has formed a basis upon which new experience has been continually added, and will continue to be added, until such time as a new and more complete work, covering the same subject, can be produced. Since that time I have published on the *Heliothinæ* in the Transactions of the American Entomological Society, and have described a few species, mostly in the Proceedings of the United States National Museum. About six years ago I was employed by Prof. Riley as a field agent of the U. S. Department of Agriculture, to make observations for the Entomological Division. Prof. Riley was greatly interested in the work I had begun, and gave me every assistance and encouragment in his power. As many of the species were injurious, and he had already worked out the habits of a large number and had notes on many more, we finally agreed upon a conjoint work on the family, which might be published by the Government, and which should contain a full summary of all obtainable information original and compiled, and be abundantly illustrated with colored figures. Work with this object in view was steadily continued for a time. Prof. Riley and I worked as well as we could apart, on the lines agreed upon between us, and a great lot of manuscript was gradually accumulated which it was intended should be worked up and completed when we could get at the labor together.

The opportunity for this closer co-laboration seemed to offer when I became Assistant Curator in the Department of Insects of the U. S. National Museum at Washington, but I soon found myself fully employed otherwise, and Prof. Riley, what with ill health and his numerous other duties, found less and less time to give to the conjoint work, so that the monograph originally proposed was never completed. Aside from these considerations, other influences helped to dampen our ardor in prosecuting the work to final issue. One was Prof. Riley's excessive caution and the desire of getting at *all* the information known and unknown concerning a species, which tended to check rapid work, the other the difficulty, if not impossibility, of getting a sufficient appropriation for the publication of a monograph so elaborately illustrated as we had planned this should be.

I found time however, in the midst of other work to prepare a number of descriptions, and to make use of the excellent library facilities at hand, and accumulated a great lot of material of use when systematic work should again become possible. When, recently, I accepted the position of Professor of Entomology at Rutgers College and Entomologist to the Agricultural Experiment Station of New Jersey, it was agreed between Prof. Riley and myself that the joint work as originally planned should be abandoned, and that, while mutual co-operation should continue, the results should be published as most convenient. It was realized that the fauna is not yet sufficiently known to enable a work to be carried on for several years without antiquating the beginning before the end was reached, as new material from new regions was constantly turning up. In consequence I shall, under the title of this paper, and the sub-title of the particular genus or group treated, publish as fast as they can be revised, the studies made by me on the *Noctuidæ*, omitting only certain special groups and genera which Prof. Riley has more particularly worked upon. No particular order will be observed, and no one publication will be selected for all the papers, but so far as possible each paper will be complete in itself, save when special considerations render advance publications of fragments desirable. The material npon which these studies are made is principally in the National Museum, but Messrs. Hy. Edwards, E. L. Graef, Geo. D. Hulst, B. Neumoegen, Fred. Tepper, A. W. P. Cramer, J. Doll, Geo. Frank, and many others have kindly placed at my disposal such material as I needed, and to them I give sincere thanks for the assistance rendered me. Prof. Riley's material I have constantly used as my own, and owing to the many bred specimens contained in it, it was most valuable in deciding specific limitations. Finally I would ask all those who are interested in this family and desire to aid me in future work to send me for study such local material as may be most abundant with them. *Everything*, even the most common species are desirable. I will gladly name in return, all those forms which they may find difficulty in identifying.

Some Modifications in the Leg Structure of Deltoid Genera.

Among the most interesting groups of the *Noctuidæ*, are the *Deltoids*. The group has been variously referred to the *Pyralidæ* or *Noctuidæ*, but seems to me better placed with the latter. It is a very decidedly peculiar one, offering many striking characters, yet impossible of such definition at present, that family rank can be accorded to it. The genera and species were among the first studied by me, and the manuscript is over four years old. Since it was written I have seen many more specimens, and have been able to complete my knowledge of species. In consequence the work must be largely re-written to bring it up to my present knowledge. One of the most attractive features of the study of this group was found in the secondary sexual characters, and more particularly those tuftings of the fore legs which might be considered as scent organs. Striking as these structures are, they have been completely overlooked, only the most casual references to them being found, and while the similar though differently placed tuftings in the *Sphingidæ* were carefully studied, the beautiful characters of the *Deltoids* recived no attention. I first gave a sketch of these structures at the Philadelphia meeting of the A. A. A. S., before the Entomological Club, and afterwards called attention to them before the Biological Society of Washington. On these occasions I also called attention to some of the peculiarities of antennal structure, which will not be considered here. In view of the fact that it will be some time before the revision of my manuscripts can be completed, and of the interesting and important nature of these structures, I have concluded to publish in advance of the systematic portion of my work, a brief description of the more prominent modifications, aiding the verbal descriptions by figures.

In the more typical genera of the *Noctuidæ* —the *non fasciatæ* of Mr. Grote—we find little in the way of secondary sexual characters, while as a rule the primary characters are well developed and specifically peculiar.

In the *fasciatæ* on the contrary, the primary characters become indefinite, weak, hardly worthy of close study, while the tendency to secondary characters becomes marked. There is an especial leaning to tuftings or other modifications of the legs, many of which have long been known, but—as in the case of *Catocala*—have been only recently brought to the attention of entomologists. *Remigia latipes* indicates by its name the effects of the tibial and tarsal tuftings, while under the name *Coptocnemia*, Zeller described as a *Deltoid* the contorted and tufted posterior tibia of *Pleonectyptera* Grote. In the *Deltoid* genera the modifications of leg structure are confined to the anterior pair, and extend to a complete change in the type of the structure. In *Hypena* and *Bomolocha* there is little modification. The coxæ are grooved to allow the femur to be closely applied to it, the femur is a mere shell into which the tibia can be almost completely concealed. The tarsi are normal, and the tibial epiphysis is close to the base of that joint, and of rather small size. The figure (1) shows the fore leg of *Plathypena** *scabra.*

Megachyta lituralis indicates the type more usually found in the *Herminiinæ.* The coxa is a mere shell, concave anteriorly to receive the convexity of the femur, which has a brush of comparatively short hair near the base, at rest folded into the concavity of the under side. The tibia is modified into a flat chitinous process which begins at the epiphysis, the first tarsal joint being here inserted, and nearly equalling in length the femur. This chitinous process of the tibia is clothed with long scales and hair, but no tuft or pencil of hair. This structure is shown at figure 2, and marks the simplest form of this type.

Chytolita morbidalis is after the same general type, but marks an important change. The coxa is as before, but there is a pencil of long hair inserted at the base, resting in the concavity, and capable of being spread fan-like. The femur here has the concavity *upward*, and at the tip is a thick pencil of long hair spreading out fan-like, as in the figure, and normally reposing in the concavity. The tibial structure is as before, save that the clothing of hair is much longer and more dense, much more so than shown in the figure (fig. 3). The 1st tarsal joint is long as in *Megachyta.* When in repose, the pencils of hair folded, the femur closely appressed to the coxa, no part of this structure is visible, and the tibial process meeting the casual view and densely clothed, is usually considered the folded tuft. The structure in some European *Herminia* is identical, or nearly so.

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* In this paper I use the generic terms used in Mr. Grote's catalogue as a matter of convenience, since synonymical matter is better left to the systematic part of the work.

Zanclognatha (fig. 4, *lævigata*) marks another advance on this type of structure. The coxa as to form and tufting is much as before, but stouter. The femur still convex below, concave above, is dilated about one-third from base, while the apex is thick, obtusely rounded. A heavy pencil of long hair, making a beautiful fan when fully expanded, is inserted in the concavity, near the tip. Somewhat within the tip beneath, are inserted the modifications of the tibia. The epiphysis is here only united at the extreme base with the tibial process, which assumes a shield-like form, widest before the middle and narrowing to a rounded tip. The first tarsal joint is now also involved in the modification, and is hollowed out beneath the protecting tibial process. Its point of insertion becomes merged at the base with the insertion of tibia. In accord with the modification of the first tarsal joint, the other joints begin to shorten, until they do not equal in their combined length the length of the first joint.

Pityolita pedipilalis (fig. 5) while essentially similar to the preceding marks a further advance or change in structure. At the point on the femur indicated by a dilation in *Z. lævigata*, we find here a pitted surface, surrounded and beset by long scale-like hair somewhat enlarged at tip. The tuftings are more dense, the hair and scales of the tibial process longer, while the tarsal joints from 2 to 5 become still shorter.

With *Philometra longilabris* (fig. 6) we enter into the bizarre, but still on the same line of modification. The coxa is much reduced in size, a mere shell, and not tufted. The femur is long, slender, also a mere shell *convex* above, reverting thus to the *Megachyta* type, and entirely without tuftings. Attached to these frail supports, is a most extraordinary development of tibia and tarsus. There is here a distinct tibia with an enormous epiphysis at base, exceeding in size the shank of the tibia. To this shank however is attached a huge process, still retaining the general form indicated in previous genera, but exaggerated in each dimension. This process is furnished with a pencil of hair on the upper side near its base, and is densely clothed with long hair and scales. From the interior of this development issues the first tarsal joint, fully as long and much stouter than the femur, and excavated in front where it is protected by the tibial process. To this exaggerated first joint are added four small additional joints, as a whole not equal to one-fourth the length of the first joint.

Litognatha nubilifascia (fig. 7) caps the climax of development in this line, and presents a re-arrangement of parts, scarcely indicated, even in *Philometra*. The coxa is stout, and of moderate length, the apical half excavated in front and furnished with a tuft of rather short hair. The femur is long and slender, apparently a complete shank and not a mere shell, and not tufted in any way. To this is attached the tibia joint which is short and stout, dilated basally, the underside of the dilated portion modified into a rounded cushion or pad with a pitted surface set with short hair. The upper side is furnished with a tuft of long hair, spreading fan-like. To the end of this joint are attached the epiphysis and the shield-like process, similar in shape, but the latter very much the larger and densely clothed with long hair and scales. The tarsi are entirely wanting. When this unique structure is folded up and closely appressed to the thorax its peculiarities are entirely marked. In the congeneric *Pallachira bivittata* Mr. Grote evidently had a specimen with partly extended legs for he remarks that the fore legs seem aborted.

In *Bleptina caradrinalis* (fig. 8) we find the extreme of a somewhat different type of structure. The coxa is moderate in length, a mere shell; the femur is very long and is a flat plate with the edges slightly bent over at sides. The tibia is short, stout, with a moderate *epiphysis* and a very long process from the tip, gradually narrowing to a point. The first tarsal joint is very long, slightly exceeding in length the tibial process, and between the two, attached to the inner side of the process at base, is a pencil of hair reaching to its tip. The remaining tarsal joints are together rather more than half as long as the first. When the tibial process is appressed to the first tarsal joint, no trace is visible, either of the pencil of hair or of the abnormal length of the tarsal joint.

In *Renia* (fig. 9) there is a decrease of modification. The tibia is more normally proportioned, the process shorter, and the tuftings are reduced to a small brush at the base of the inner side.

In *Torticodes* (fig. 10) there is a still further reduction in the modification, and no brush of hair.

Finally in *Epizeuxis* (fig. 11) the leg structure is nearly normal, the femur being clavate, and excavated beneath so as to receive the tibia.

In *Palthis* (fig. 12) the male palpus is peculiarly modified to accomodate a great tuft of hair—much greater than indicated in the figure —but this is given merely as an illustration of a different location for these tuftings.

What is the purpose of these structures? That they have a purpose must be assumed, and as they occur in the male only they may be taken as matter of sexual importance, especially as they are accompanied by striking antennal modifications which I will describe at another opportunity. Müller and others consider them scent organs, and this explanation is the only one that has any appearance of reason. In *Hepialus hecta* the cellular structure of the modified tibia has been examined, and large gland-like cells have been made out. In some of my preparations I am very certain a similar structure can be made out, but the mounted specimens were not prepared for such investigations and I cannot be sure. There is an excellent field here for the histologist or close anatomical student, rather than for the mere systematist to whom structure is valuable mainly from the assistance it gives him in the classification of the specimens.

EXPLANATION OF PLATE.

1—Fore leg of *Plathypena scabra*, ♂.
2— " " *Megachyta lituralis*, ♂.
3— " " *Chytolita morbidalis*, ♂.
4— " " *Zanclognatha lævigata*, ♂.
5— " " *Pityolita pedipilalis*, ♂.
6— " " *Philometra longilabris*, ♂.
7— " " *Litognatha nubilifascia*, ♂.
8— " " *Bleptina caradrinalis*, ♂.
9—Fore tibia of *Renia* sp., ♂.
10— " " *Tortricodes bifidalis*, ♂.
11—Fore leg of *Epizeuxis æmula*, ♂.
12—Palpus of *Palthis angulalis*, ♂.

◆

A Plague of Psocids!

Somewhere recently,—I think in "Insect Life," but have not the paper handy—there appeared an account of an invasion of *Psocids,* which it was found almost impossible to get rid of. Two exactly similar cases came under my notice in New Jersey, but a few days ago, causing considerable dismay since they were considered small forms of *Pediculus vestimenti* left as a legacy by tramps who had been sheltered. They appeared suddenly and in immense numbers, covering the beds, invading clothes presses, congregating on the walls and filling corners. The neat housewife was dismayed, and every remedy known in the battery of housecleaning was brought to bear upon them. The slaughter was great, but so was the supply. Of course the supposed cause of this unusual house-cleaning was carefully kept secret, and imparted to me only in the strictest confidence, together with a mutilated specimen for examination. Though not sufficiently perfect to identify the species, there was enough of the specimen to enlighten me as to the nature of the attack, and to enable me to afford consolation and advice. I have found that where they appeared on a small scale, naphthaline is a sovereign remedy for *Psocids,* and I have no doubt it will work equally well on a larger scale.

Nemeophila plantaginis, *Linn.*

By David Bruce.

Brockport, N. Y.

This species is rather common at Clear Creek and Platte Cañons, Colorado, at from 7,000 to 10,000 feet elevation, both sexes flying rather briskly by day in June and July. I obtained a few eggs from a worn female, and reared several broods in succession, carrying a number through hibernation. The parent female had yellow and black underwings and of the bred examples I have almost every possible variation. Some have underwings entirely black; some black with one white spot, with spot and band; some with white underwings with black rays, and many with yellow instead of white: the markings and colorations of the upper wings are also as variable. Of course all this proves these are but one species, yet I have not seen any examples exactly like the typical form of *N. plantaginis* from Europe, the difference being about as perceptible as that between *Euprepia americana* and *E. caja.*

The eggs were light wax yellow and hatched in 8 days. The young larvæ were dark gray, changing to jet black at first moult; at third moult a brown dorsal patch appeared; when full grown the larvæ were as follows: Body velvety black, rather sparsely covered with spreading tufts of fine, stiff, yet silky hairs, springing from glittering steel-like tubercles. The head and hairs on the first three segments jet black. A cape-like patch of chestnut colored hairs covers the median third of back, formed by 6 tufts on 5th and 6th segments, 4 on 7th, and 2 on 8th, the rest of the body clothed with black hairs, becoming longer and more silky on the two posterior segments and a few long white hairs are mingled with them. The lower side of body is fringed with yellowish-brown hairs from two tufts on each segment along the spiracles. The pro-legs and underside of body livid, the true legs jet black.

The larva fed by night, basking in the sun by day, when possible, and are the most lively and shy of my Arctian larvæ, dropping to the ground and quickly hiding if disturbed. They also have a trick of curling themselves and suddenly springing open, thus jumping several inches off the food plant. When full-fed they crawled into the upper corners of the breeding cage or down into the moss indifferently, formed a very slight web, and pupated. Imago appearing in two weeks. I fed them on narrow-leaved plantain, that plant not dying down in the winter like the broad-leaved species.

Phycitidæ and Galleriidæ of North America. Some New Species and a General Catalogue.

By E. L. Ragonot.

Since the publication of Mr. Grote's Check List a great number of North American *Phycites* have been described so that it has become necessary to give a general catalogue of these insects. Thanks to the kindness of Mr. Hulst I have been able to study the greater number of his species so that the catalogue which follows may be considered as revisional and at the same time as the expression of my views on the classification of the *Phycitidæ*. All the species have been studied by me and I hope to have an opportunity of seeing the rest of Mr. Hulst's species and will then hasten to make any necessary additions and corrections.

The following four species are new to science :

Myelois subtetricella Rag.

19—22 mm. Fore wings elongate, oval, very narrow at base, strongly rounded on costa, dark gray, much suffused with brownish, glossy, first line broad, oblique, straight, gray, indistinct, edged outwardly by a shadowy blackish line, second line hardly perceptible, oblique, straight, very narrow, hardly paler than ground color. A dark spot, hardly distinct on disk. Hind wings transparent whitish, smoked on margin. Very near to *tetricella* F.

Hab.—North America, exact locality unknown.

Myelois zonulella Rag.

22 mm. Fore wings hardly dilated posteriorly, pale blackish gray, darker in median area, lines pale, edged with black, the first oblique, straight, extending nearly to the middle of inner margin, very broadly edged with black on the outside. Second line oblique, sinuous. Discal spots indistinct, black. Hind wings blackish brown gray. Smaller than *bilineatella*, the costa and inner margin nearly parallel, its hind-wings much darker.

Hab.—North Illinois, 4 specimens in Grote's coll. in Brit. Mus.

Acrobasis minimella Rag.

13—14 mm. ♀. Fore wings short, rounded on costa, dark gray suffused with purple, paler at base, a large black, triangular costal patch after first line, the median area on the inner margin and along the second line reddish fuscous. First line oblique, rounded outwardly, broadening in inner margin, reddish ochreous, preceeded by a vertical rounded ridge of raised black scales, broad on the inner margin, attenuated towards the costa which it does not attain. Second line pale, sinuous, distinct. Discal spots distinct. Hind wings grayish fuscous. Very near *angusella*, remarkable by its small size.

Hab.—Texas.

Saluria dichrœella Rag.

19 mm. Fore wings oval, narrow at base, strongly rounded on costa, costal half whitish, sparingly dusted with reddish brown, the dorsal half grayish brown with a reddish tint, paler on hind margin but sharply defined and rather darker along the median vein. Hind wings even pale yellowish, the cilia slightly darker. Resembles very much my *bipartitella* and also *opacella* Hulst.

Hab.—Texas.

The species of Mr. Grote's Check List amounted to 48, the present Catalogue contains 178 and 5 varieties. Most of these species have been described in the following papers:

Hulst—Trans. of the Amer. Ent. Soc., July, 1886, pp. 161—164.
Hulst—Entomologica Americana, Oct., 1887, pp. 129—138.
Ragonot—Diagnoses of North American Phycitidæ and Galleriidæ. Paris, December, 1887.
Ragonot—Nouveaux genres et especes de Phycitidæ et Galleriidæ. Paris, April, 1888.
Hulst—Entomologica Americana, Sept., 1888, pp. 114—118.

Catalogue of the Phycitidæ and Galleriidæ of North America.

PHYCITIDÆ.

Myelois Hb.
subtetricella Rag.
bilineatella Rag.
zonulella Rag.
alatella Hulst [Acrob.].
   rectistrigella Rag.
duplipunctella Rag.

Rhodophæa (Gn.) Rag.
pallicornella Rag.
histriculella Hulst [Acrob.].
exsulella Z. [Myelois].

Acrobasis Z.
palliolella Rag.
   albocapitella Hulst.
tricolorella Grote.
amplexella Rag.
Angusella Grote.
caryæ Grote.
minimella Rag.
caryivorella Rag.
rubrifasciella Pack.
comptella Rag.
vaccinii Riley.
juglandis Le Bar. [Pemp.].
indigenella Z.
   nebulo Walsh. [Phycita].
   zelatella Hulst [Myelois].

Piesmopoda Z.
subrufella Hulst [Neph.].
filiolella Hulst [Neph.].

Phycita (Curt.) Rag.
arctella Rag. [Bahamas].

Phycitopsis Rag.
flavicornella Rag.

Dioryctria Z.
miniatella Rag.
clarioralis Wlk. [Neph.].
Zimmermanni Grote [Pinipestis].
amatella Hulst [Neph.].
pygmæella Rag.
decuriella Hb.
   abietella S. V. n. Cat. Zk.
   reniculella Grote [Pinipestis].
   abietivorella Grote “

Dasypyga, Rag.
alternosquamella Rag.
ab. stictophorella Rag.

Tacoma Hulst.
feriella Hulst.

Promylea Rag.
lunigerella Rag.

Glyptocera Rag.
consobrinella Z. [Neph.].

Ortholepis Rag.
jugosella Rag.

Ambesa Grote.
Walsinghami Rag. [Prist.].
lætella Grote.

lallatalis Hulst [Neph.].
denticulella Rag. [Prist.].
niviella Hulst [Lipographis].

Nephopteryx Hb.

pergratialis Hulst.
Grotella Rag.
scobiella Grote.
decimerella Hulst [Lipo.].
furfurella Hulst.
ovalis Pack.
v. geminipunctella Rag.
v. hypochalciella Rag.
v. curvatella Rag.
fasciolalis Hulst [Pinipestis].
finitella Wlk.
rubrisparsella Rag. [Prist.].
rufibasella Rag.
croceella Hulst [Sciota].
gilvibasella Hulst.
basilaris Z.
reductella Wlk.
Gleditschiella Fern. [Pemp.].
inquilinella Rag.
crassifasciella Rag.
subtinctella Rag.

Meroptera Grote.

pravella Grote [Pemp.].
uvinella Rag.
unicolorella Hulst. [Dior. & Oreana]

Salebria Z.

pumilella Rag.
nubiferella Rag.
tenebrosella Hulst [Neph.].
bistriatella Hulst [Diory.].
quercicolella Hulst [Neph.].
annulosella Rag. [Neph.].
semiobscurella Rag.
subfuscella Rag.
contatella Grote.
v. quinquepunctella Grote.
tarmitalis Hulst.
delassalis Hulst [Neph.].
Fernaldi Rag.
bifasciella Hulst [Neph.].
aliculella Hulst [Myelois].
Oberthuriella Rag.
odiosella Hulst [Neph.].

Laodamia Rag.

fusca Hw.
spadicella Zk.
carbonariella Zk.
posticella Zett.
janthinella Dup.
mœstella Wlk. [Neph.].
undulatella Wlk.
frigidella Pack. [Eudorea].
cacabella Hulst [Pinip.].

Elasmopalpus Blanch.

erectalis Walk. [Trach.].
rufinalis Wlk. [Neph.].
hapsella Hulst [Neph.].
decoloralis Wlk. [Trach.].
metagrammalis Wlk. [Neph.]
lignosellus (a) Z. [Pemp.].
angustellus Blanch.
tartarella Z. [Pemp.].
incautella Z. [Pemp.].
petrella Z. [Pemp.].
carbonella Hulst [Dasyp.].

Selagia Z.

lithosella Rag.

Anoristia Rag.

flavidorsella Rag.

Pyla (Grote) Rag.

scintillans Grote.
æneoviridella Rag.

Epischnia Hb.

ruderella Rag.
Boisduvaliella Gn.
Farrella Curt. [Anerastia].
Lafauriella Const.
albocostalis Hulst [Ephestia]
Fosterella Hulst [Pima].
subcostella Rag.
fulvirugella Rag.
granitella Rag.

Megasis (Gn.) Rag.

polyphemella Rag.
pullatella Rag.

Lipographis Rag.

humilis Rag.
fenestrella Pack. [Pemp.].
leoninella Pack. [Pemp.].
subosseella Hulst [Bahamas].

Hypochalcia Hb.
Hulstiella Rag.

Sarata Rag.
nigrifasciella Rag.
dophnerella Rag.

Etiella Z.
Zinckenella Tr.
shisticolor Z.
villosella Hulst.

Melitara Wlk. (Megaphycis Grote).
prodenialis Wlk.
Bollii Z. [Zopho.].
dentata Grote [Megaph.].

Zophodia Hb.
graciella Hulst [Spermat.].
longipennella Hulst.
grossulariæ Pack. [Pemp.].
turbatella Grote [Dakr.].
Packardella Rag.
glaucatella Hulst [Honora].
dilatifasciella Rag.
ardiferella Hulst [Altoona].

Euzophera Z.
aglæella Rag.
semifuneralis Wlk. [Neph.].
impletella Z.
pallulella Hulst [Stenopt.].
nigricantella Rag.
cuprotæniella Christoph.
ferruginella Rag.
sonorella Rag.

Cateremna Meyr.
tumidulella Rag.

Vitula Rag.
dentosella Rag.
serratilineella Rag.
basimaculatella Rag.

Psorosa Z.
Hammondi Riley [Pemp.].
pneumatella Hulst [Stenopt.].
ulmella Rag.
fuscatella Hulst [Honora].

Lætilia Rag.
coccidivora Comst. [Dakruma]
pallida Comst. "
ephestiella Rag. [Dakruma].

Staudingeria Rag.
albipennella Hulst [Pemp.].

Heterographis Rag.
Morrisonella Rag.
coloradensis Rag.
olbiella Hulst [Mona].
oblitella Z.
propriella Wlk. [Neph.]
undulatella Clems.

Honora Grote.
mellinella Grote.
ochrimaculella Rag.
sciurella Rag.
subsciurella Rag.
canicostella Rag.

Dolichorrhinia Rag.
aureofasciella Rag. [Macro].

Diviana Rag.
eudoreella Rag.

Homœosoma Curt.
impressalis Hulst.
electella Hulst [Anerastia].
texanella Rag.
opalescella Hulst [Ephestia].
tenuipunctella Rag.
illuviella Rag.
candidella Hulst.
uncanalis Hulst [Neph.].
albescentella Rag.
stypticella Grote.
mucidella Rag.
anguliferella Rag.

Ephestiodes Rag.
gilvescentella Rag.
infimella Rag.
erythrella Rag.

Eurythmia Rag.
hospitella Z. [Ephes.].
minutularia Hulst [Dioryct.]
quantulella Hulst [Pemp.].
ignidorsella Rag.

Hornigia Rag.
obtusangulella Rag.
lugubrella Rag.

Ephestia Hb.
fuscofasciella Rag.

Kuehniella Z.
Rileyella Rag.
nigrella Hulst.
elutella Hb.

Plodia Gn.

interpunctella Hb.
zeæ Fitch [Tinea].

Anerastinæ Rag.

Ragonotia Grote.

dotalis Hulst [Neph.].
discigerella Rag. [Ciris].
lativitella Rag.

Tolima Rag.

opacella Hulst [Altoona].

Poujadia Rag.

gemmatella Hulst [Spermat. and Cayuga]

Saluria Rag.

ostreella Rag.
glareosella Z. [Aneras.].
rostrella Rag.
tetradella Z. [Aneras.].
dichrœella Rag.

Martia Rag.

arizonella Rag.

Aurora Rag.

longipalpella Rag.

Navasota Rag.

hebetella Rag.

Hypsotropa Z.

luteicostella Rag.

Peoria Rag.

hæmatica Z. [Aneras.].
roseatella Pack. [Neph.].
bipartitella Rag.

Anerastia Hb.

Ella Hulst [Ephestia].

Bandera Rag.

cupidinella Hulst.
binotella Z. [Aneras.].
subluteella Rag.

Tampa Rag.

dimediatella Rag.

Statina Rag.

roseotinctella Rag.

Cœnochroa Rag.

californiella Rag.
inspergella Rag.
illibella Hulst [Petaluma].
puricostella Rag.

GALLERIIDÆ.

Epimorius Z.

testaceellus Rag.

Melissoblaptes Z.

fuscolimbellus Rag.

Galleria L.

mellonella L.

Paralipsa Butler.

fulminalis Z. [Melissob.].
terrenella Z. ["].
furellus Z. [Melissob.].

Aphomia Hb.

colonella L.

Achroia Hb.

grisella F.

Species incertæ sedis etc.

The following species are unknown to me:

albiplagiatella Pack. (Myelois).
actualis Hulst (Neph.).
auranticella Grote (Pinipestis).
approximella Wlk. (Pempelia).
bifascialis Wlk. (Neph.).
bonifatella Hulst (Sperm. and Tehama).
cestalis Hulst (Anerastia).
caliginella Hulst (Neph.)
Edwardsialis Hulst (Megaphycis).
excantalis Hulst (Anerastia).
Edmandsii Clem. (Neph.).
Fernaldalis Hulst (Megaphycis).
Georgiella Hulst (Myelois).
indistinctalis Wlk. (Neph.).
multilineatella Hulst (Spermat. and Welaka).
oreadella Hulst (Uinta).
obsipella Hulst (Honora).
olivella Hulst (Anoristia).
ostrinella Clem. (Ephestia).
ochrifrontella Z. (Ephestia).
perfuscalis Hulst (Neph.).
rubiginella Wlk. (Neph.).
subcæsiella Clem. (Pemp.).
ulmiarrosorella Clem. (Neph.).
virgatella Clem. (Pemp.)
montinatatella Hulst (Spermat.).
carneella Hulst (Neph.).

SYNONYMICAL NOTES.

Atrifascialis Hulst (Tallula) is an Epipaschiid.—*Inimicella* Z. (Galleria) is a Tortrix (genus *Pseudogalleria* Rag.).—*muleolella* Hulst (Pempelia) is a Pyralid (genus *Arta* Grote).—*Rhypodella* Hulst (Glyptoteles) is *Neph. curvatella* Rag. possibly.

The Eggs and Larvæ of Cerathosia tricolor, *Smith.*

By Geo. D. Hulst.

About the middle of April, I received a letter from a correspondent in Central Texas, telling me that he had sent by mail a box with some eggs enclosed, of the much discussed *Cerathosia tricolor*. He was, however, unable to give any indication of the food plant. When the box arrived all the larvæ had emerged, and the most were dead, but a few still had life enough to move about, and very much to my surprise were lively little Geometers!

The eggs are spherical, somewhat flattened, and much grooved and grained.

The caterpillars on emerging are about one-eighth of an inch in length, head dark, broad, deeply indented at the summit between the eyes; front triangular with apex at indentation of summit. Mandibles with 5 teeth. The eyes are marked with 8 or 10 scattered hairs.

Body cylindrical, with segments very slightly if at all swollen. Each segment has, rather irregularly located, from 14 to 20 piliferous spots each one with one perpendicular hair, or two divergent ones. Those armed with two hairs constitute about one-third of the whole number. These hairs as well as the body are dark brown or blackish in color.

There are only six pairs of legs in all, the two anterior pairs of abdominal legs being almost entirely aborted, though still evident. They are however in no way used in walking, and the motion of the caterpillar is entirely geometriform, the central part of the body being fully arched, and the hind pairs of legs being brought close to the pro-legs in progression.

To what extent this will clear up the systematic position of the insect, I am unable to say. The spines are decidedly arctiiform, but the existence of 12 legs only in the larva seems to put it where Mr. Grote thinks it belongs, as allied to *Acontia* and *Spraguia*. The larvæ of *Acontia* have, I believe, 10 legs only. The larvæ of the species of *Spraguia* are so far as I know unknown, but the larvæ of the nearly allied European genus *Agrophila* has 12 legs and thus corresponds with the larvæ of *Cerathosia*. As far as I can learn however the larvæ of both *Acontia* and *Agrophila* are naked.

I was unable to find any plant of which the larvæ would partake. Indeed, it is doubtful whether enough strength remained to any to live even if a proper food plant had been found. At any rate the larvæ were not carried beyond emergence from the egg.

NOTE BY EDITOR.

The above communication was presented by Mr. Hulst at the May meeting of the Brooklyn Entomological Society, and proved of course very interesting. Mr. Hulst kindly gave me a slide containing mounted specimens of the larva, for examination. He is quite correct in his description, but I really doubt whether, if he had not seen the mode of progression, he would have found the reduction of size in the anterior pairs of pro-legs, worthy of particular remark. They are undoubtedly much reduced in size, the first pair more than the second, but they are armed about like the perfect legs, and I feel certain that had they been carried through another stage, they would have become normal *Lithosian* larvæ. At the present stage Mr. Hulst's observations, though extremely interesting, can have no systematic weight against the obvious structural characters of the imago. I regret that I have not at command at present the literature of the Lithosiid larva, so cannot compare with known forms. I trust however that the near future will bring other specimens of the larva which can be carried to maturity.

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Note on Spilosoma congrua, *Walker*.

By John B. Smith.

The bibliography of this species, as it stands in our lists to-day, is as follows:

Spilosoma congrua Walker.
1855.—Walker, Cat. Br. Mus. Lep. Het., III, 669.
1860.—Clem., Proc. Ac. N. Sci. Phil., XII, 532.
1862.—Morris, Synopsis, Supplt., 343.
1868.—Grt. & Rob., Trans. Am. Ent. Soc., II, 72.
1873.—Stretch., Zyg. and Bomb., 130.
1875.—Butler, Cistula Ent., II, 33, = *cunea*!
1883.—Grote, Can. Ent., XV, 9.
1886.—Hulst, Entom. Amer., II, 15, (larva).
antigone Strecker.
1878.—Strk., Rept. Engin. 1877–78, V, p. 1860.
1883.—Grote, Can. Ent., XVI, 9, = *congrua*.
1886.—Hulst, Entom. Amer., II, 162 = *congrua*.

Habitat.—Mass., New York, Georgia, Colorado. The insect is thus a widely distributed one, though not common anywhere.

Some time since I found it desirable for some reason to compare Walker's description with specimens of what goes, *fide* Mr. Grote, as *congrua*. I believe it was Mr. Strecker's differential description of his *antigone* that first called my attention to it. To my surprise I found that if Walker's description was in any way accurate, it could not possibly refer to this species, and in casting about for a species to which it could possibly be referred, I picked out of our series of *Hyphantria cunea*, specimens in every way agreeing with the description. So certain did I feel of this, that I called Prof. Riley's attention to it as a necessary correction of synonymy, and afterward stated the conclusion before the Entomological Society of Washington.

Walker's description is as follows: "White. Tarsi with black bands. Fore coxæ and fore femora luteous, with black spots on the inner side. *Male*—Head and fore part of the thorax with a slight testaceous tinge. Primaries with four very oblique, very imperfect and irregular bands, composed of pale brown dots. Length of the body 6 to 7 lines; of the wings 16 to 20 lines."

In 1868 Grote and Robinson state that of three specimens in the B. M. Collection one female was *Spilosoma virginica*, the other specimens, male and female, representing a species approaching *H. cunea* in markings, but stouter and with the antennæ and palpi of *Spilosoma*.

In 1875 Mr. Butler speaks as follows: "The only examples now representing this species in the collection are what I believe to be a male variety of *H. cunea*, and a female (?) *Spilosoma virginica*, without abdomen; what Mr. Walker may have done with the species since Mr. Grote described it, it is impossible to say."

This note of Butler's seems to have entirely escaped American Lepidopterists. Strecker did not refer to it in describing his *antigone*, and Mr. Grote seemed not to know of it when in 1883 he referred *antigone* as a synonym of *congrua*. Mr. Hulst in his paper assumed the correctness of Mr. Grote's identification of *congrua*, and shows that the species varies sufficiently to include the form described by Mr. Strecker. No attempt seems to have been made to reconcile Walker's description with the species as identified by Mr. Grote, and in view of the facts that the description cannot possibly be made to fit *antigone* Strecker, that it agrees perfectly with specimens of *H. cunea*, and that Mr. Butler finds a specimen of *cunea* as a type, it seems to me that *congrua* Walker, must be referred as a synonym of *H. cunea* Dru., and *congrua* ‡ Grote, must be cited as a synonym of *antigone* Strecker.

Mr. Henry Edwards recently showed me in his collection a species of *Spilosoma* apparently distinct from all described species, and which agrees very well with Walker's description save in the maculation of the abdomen.

The genus *Spilosoma* needs revision, and as Mr. Edwards has all the described as well as some new species, he will probably undertake the task shortly.

Some Corrections to Henshaw's List of the Coleoptera of North America.

One of the greatest desiderata in the present state of North American Coleopterology is a full reference and synonymical catalogue. Although such work has been contemplated for several years and is in the best hands that could possibly be selected for this purpose, we are afraid that the publication of such catalogue will be delayed for some time to come and that we shall see a new edition of the check list sooner than the much desired catalogue. This being so, the Coleopterists should cooperate in rendering the new check list as free from errors as possible; for, while it is a comparatively easy task to insert the additions, it is difficult to eliminate the various errors of minor or greater importance which have crept into the former editions of the check list, errors which are inseparable from and inevitable in a work of this character and for which the most careful author cannot be held responsible, but which are liable to be perpetuated from one edition to another unless special attention is called thereto.

For this purpose we publish the following few corrections which were placed at our disposal by Mr. Schwarz:

p. 43—for *Homalium rufipes* Faüv., read *H. rufipes* Faurcroy.
p. 47—omit *Hippodamia variegata* Gœze.
p. 46—for *Adonia constellata* Laich., read *A. variegata* Gœze.
p. 61—omit *Grynochares oregonensis* Crotch, which is a manuscript name.
p. 61—insert before *Monotoma* the family heading *Monotomidæ* to include the genera from *Monotoma* to *Bactridium* inclusive.
p. 78—*Telephorus pusillus* Lec., appears twice, once as a distinct species, and again as a synonym of *rectus*. In the present state of knowledge of this genus the latter reference should be omitted.
p. 83—for *Hadrobregmus pumilis* Lec., read *H. pumilus* Lec.
p. 84—omit *Theca striatopunctata* Lec., which is a manuscript name.
p. 85—omit *Trogoxylon californicum* Crotch, for the same reason.
p. 124—for *Xylita lævigata* Hellw., *Serropalpus* Hellw., *S. striatus* Hellw., read *Xylita lævigata* Hellenius etc.
p. 137—*Apion porcatum* is erroneously placed among the unrecognized species.

J. B. S.

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We exceedingly regret hearing of the death of Heinrich Benno Moeschler, of Kronfoerstchen bei Bautzen, Germany. Mr. Moeschler was one of the few European entomologists who had a really good idea of our Lepidopterological fauna, and was able to appreciate the work done on this side of the Atlantic. His death is a positive loss to American entomology. We have not been able heretofore to learn anything of a personal nature concerning him, but hope in an early number to be able to give a brief sketch of his life and of his work so far as American entomology is concerned.

Life Habits of Hispidæ.

Dr. Horn, in describing the remarkable Hispid, *Stenopodius flavidus* (Trans. Am. Ent. Soc., vol. X, 1883, p. 301), suggests that from certain structural characters (apical thoracic margin with a depression each side apparently for reception of antennal club; tarsi not dilated, slender, claw-joint extremely long) that the species has a subaquatic mode of life. In a species coming from the arid regions of Arizona and California we would least expect such mode of life and we look forward therefore with interest toward future observations which may prove or disprove the correctness of Dr. Horn's surmise.

The few *Hispidæ* in our fauna of which the earlier stages, or at least the food-habits are known, are leaf-miners, the larvæ closely resembling in general appearance certain leaf-mining *Tineidæ (Lithocolletis)*; but the little we know of foreign species indicates a great diversity of life-habit in this family. The earlier stages of the few European species still remain unknown, but since *Hispa atra* is quite abundant it may be inferred that the larva would long ago have been discovered if it were a leaf-miner. Mr. Lucas (Ann. Soc. Ent. France, 1884, Bull., p. V) describes the larva of *Oxycephala speciosa* Boisd., from New Guinea. It resembles in appearance a Crustacean of the family *Cymothidæ* and covers itself with its shiny excrement in the manner of *Crioceris* or *Blepharida* Moreover it is not leaf-mining but lives at the axils of the leaves of *Pandanus*. Another species, *Leptispa pygmæa* Baly, was found by Mr. G. Lewis, near Colombo, Ceylon, "resting on the stems of a small grass just above water; but if immersed, remained quiescent beneath it" (Entom. Month. Mag., vol. XXV, Sept., 1888, p. 94). This seems to indicate a subaquatic mode of life in the larva state, though in the genus *Leptispa* the tarsal joints are short and dilated. In this particular species, however, "the body beneath is covered with the close pilosity common to some insects, such as *Donaciæ*, which are indifferent to immersion in water."

To return to our own fauna, there is no indication that in the genera *Odontota*, *Microrhopala* and *Octotoma* the unity of habit is interrupted. They appear to be terrestrial and leaf-mining in the larva state, and so is in all probability the genus *Charistena*, but our *Stenispas* probably differ in habit. The imagos occur preferably on low, moist meadows or on plants near water and their larvæ are probably either root-feeders in moist ground or subaquatic like those of *Donacia*. J. B. S.

A Reclamation.

In "Insect Life" No. 10, Prof. Riley adds some interesting information concerning *Platypsyllus* and figures both the larva and imago. He gives also a resumé of the literature, but whether intentionally or not, omits all mention of my paper (Trans. Am. Ent. Soc. 1888) in which the larva is fully described and figured. This omission is all the more inexcusable as the first public exhibition of the larva and my figures was made before the Entomological Society of Washington some time in March, 1888, Prof. Riley being present and taking part in the discussion. Geo. H. Horn, M. D.

Cicada septendecim in 1889.

Before and on receipt of this number of ENTOMOLOGICA AMERICANA many of our readers in the Eastern and Middle States will no doubt have heard the song of that most interesting of our North American insects—the Periodical *Cicada.* To anticipate inquiries regarding this insect we desire to state that the Cicadas of the present year belong to the 17-year brood VIII, according to the enumeration introduced by Dr. C. V. Riley in his 1st Missouri Report. This brood is a well-established one, and has been recorded in the year 1786, 1804, 1821, 1838, and 1855. There is further strong probability that this is the brood referred to by Morton in his "Memorial" as occurring in Plymouth, Mass., in 1633 (see Harris, Treatise etc., p. 207, ed. Flint). Its re-appearance in 1872 has no doubt been observed in many localities but, strangely enough, there do not seem to be any records thereof in the more accessible literature, and no one has gone into the trouble of collecting the records—if there be any—from the agricultural papers and similar sources. The extent of this brood, as compiled from all available sources, is given by Dr. Riley as follows: "in the south-eastern part of Massachusetts; across Long Island; along the Atlantic coast to Chesapeake Bay, and up the Susquehanna River at least as far as to Carlisle in Pennsylvania; also in Kentucky, at Kanawha in (West) Virginia, and Gallipolis, Ohio, on the Ohio river."

The Cicadas reported in 1855 from Buncombe and McDowell counties, North Carolina, have apparently been lost sight of, and it is still doubtful whether they should be referred to this 17-year brood VIII or the 13-year brood XVIII, both having appeared simultaneously in 1855. From the localities given by Dr. Riley for the brood XVIII it appears highly probable that these Cicadas belong to this 13-year brood XVIII rather than to the 17-year brood VIII.

At any rate the entomologists and their correspondents—no matter whether or not these understand anything of entomology—could do very much this year to more fully ascertain the extent of this brood and to clear up the doubtful points concerning the same, by looking out for, and recording all reports on the appearance of Cicadas or "Locusts" as they are popularly termed. The knowledge of the various broods of the Periodical *Cicada* is now sufficiently advanced to enable us to eliminate all untrustworthy reports resulting from a confusion of the Cicadas with the true "Locusts" (Grasshoppers) or with the various other non-periodical species of *Cicada.*

J. B. S.

Society News.

Brooklyn Entomological Society.—APRIL 2nd, 1889. Twenty persons present, President Casey in the chair. Reports were presented by the treasurer, the librarian and the curators, which were duly accepted. The resignation of Messrs. Hulst and Roberts, editors of ENTOMOLOGICA AMERICANA, having been tendered and regretfully accepted by the Society, Messrs. Smith and Chittenden were elected to fill the vacancies.

Mr. Weeks read a paper on "Utilization of Entomological Experience," showing the value of apparently unimportant notes in completing the life histories of insects. In the discussion which followed Messrs. Hulst and Smith took part.

MAY 7th, 1889.—Twenty persons present. The president in the chair. Reports of officers were presented and accepted, and considerable routine matter was discussed and disposed of. Messrs. A. C. Bradley and J. G. Maloneé, both of Brooklyn and members of the Brooklyn Institute were elected to membership in the Entomological Department.

Mr. Smith read a communication from the Netherland Entomological Society, embracing a report of a committee on a proposed code of nomenclature, and requesting consideration of the matter. Messrs. Casey, Smith and Hulst were thereupon appointed a committee for that purpose.

Mr. Hulst read a paper on "*Cerathosia tricolor*, Smith," and exhibited microscopic slides of the larvæ. Messrs. Smith and Weeks joined in the discussion which followed.

Mr. Smith then presented the subject "Scent Organs of the Lepidoptera," with black-board illustrations. The subject was discussed by Messrs. Hulst, Weeks and Beutenmüller.

A. C. WEEKS, *Rec. Sec'y.*

Notes and News.

IT is intended to prepare for publication a "List of the Insects of New Jersey." Will those of our readers who have collected in this State please make lists of their captures and forward them to the editor with such notes as they may add. They will be duly acknowledged and made use of.

* * *

IN our next number we hope to publish a second supplement to Henshaw's List of Coleoptera, together with a list of synopses and monographic works which have appeared since the publication in 1883 of Leconte and Horn's Classification. A few extra copies will be printed and be furnished at 25 cents per copy. All desiring such will please notify the editor at once.

* * *

A few copies of the Monograph of the N. A. Sphingidæ can be obtained from the editor, at $2.00 per copy. There are also two complete sets of the Bulletin Brooklyn Ent. Soc. at $8.00 per set, of 7 volumes.

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ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, JULY, 1889. NO. 7.

A GENERIC SYNOPSIS OF THE BYTHOSCOPIDÆ.

By Wm. H. Ashmead.

Family V. BYTHOSCOPIDÆ.

Head as wide or wider than the thorax, when narrower very thin antero-posteriorly with a sharp superior margin; the frons in the former case obtuse or slightly convex, in the latter, flattened. Ocelli 2, situated on the frons between the antennæ. Antennæ setiform, 3-jointed, the basal joints short, thick, placed in cavities. Thorax well developed, wider than long, or else hexagonal, slightly convexly rounded, punctate, or with delicate striations. Scutellum rather large, triangular. Elytra subopaque, seldom entirely translucent. Tegulæ present. Posterior coxæ contiguous. Tibiæ prismatic, the hind edges of posterior pair most frequently armed with a double row of numerous strong spines or else with small denticulations or fine ciliæ. Tarsi 3-jointed.

This family is of rather small extent and represented by but comparatively few genera; in it I have included, as subfamilies, the genera *Æthalion* Latreille, and *Eurymela* Burmeister, the position of which has been the subject of considerable controversy with systematists.

The former, seems to be closely allied to the *Membracidæ* where Stäl placed it; the latter, to the *Jassidæ*, but their general facies and the position of the ocelli are Bythoscopid, and I believe they belong in this group.

The following table will enable one to recognize these subfamilies:

SUBFAMILIES.

Head transverse, antero-posteriorly very thin, much narrower than the thorax; frons flat, upper margin sharp; thorax hexagonal, the sides usually sinuate...... .
Subfamily I. ÆTHALIONINÆ.

Head broadly transverse, antero-posteriorly rarely very thin, as broad or broader than the thorax; frons usually convex, upper margin rounded; thorax transverse quadrate or somewhat trapezoidal, sides not sinuate.

*Posterior tibiæ usually not strongly spined, at the most with two or three spines, or else with a double row of weak spines or ciliæ .... SUBFAMILY II. **EURYMELINÆ.**

Posterior tibiæ always with a double row of strong spines .... SUBFAMILY III. **BYTHOSCOPINÆ.

SUBFAMILY I. ÆTHALIONINÆ.

TABLE OF GENERA.

Head deeply emarginated .... G. 1. **Schizia** Spinola

Head not or but slightly emarginated.

Costal area with 3 to 5 transverse veins, none forked...G. 2. **Æthalion** Latreille

Costal area with 9 transverse veins, the 2nd forked; outer edge of posterior tibiæ with numerous small denticulations..........G. 3. **Polydontoscelis** n. g.*

SUBFAMILY II. EURYMELINÆ.

TABLE OF GENERA.

Posterior tibiæ with not more than 2 or 3 spines .... G. 1. **Eurymela** Burm.

Posterior tibiæ with a double row of very weak spines .... G. 2. **Eurymeloides** n. g.

SUBFAMILY III. BYTHOSCOPINÆ.

TABLE OF GENERA.

Antennæ inserted in feeble cavities 2

Antennæ inserted in deep cavities beneath a ledge.

Thorax with transverse striations.

Lateral margins of thorax sharply keeled, of moderate length .... G. 1. **Macropsis** Lewis

Lateral margins of thorax not sharply keeled, very short .... G. 2. **Bythoscopus** Germ.

Thorax with oblique striations .... G. 3. **Pediopsis** Germ.

2 Head including the eyes wider than the elytra at base.

Membrane with an appendage .... G. 4. **Idiocerus** Lewis

Membrane without an appendage .... G. 5. **Pachyopsis** Uhler

Head including the eyes not wider than the elytra at base.

Membrane without an appendage .... G. 6. **Agallia** Curtis

---

* A new genus discovered in Florida.

SECOND SUPPLEMENT TO THE LIST OF COLEOPTERA OF AMERICA, NORTH OF MEXICO.*

By Samuel Henshaw.

I have endeavored to record here the new species of Coleoptera, found in America, north of Mexico, which have been described from 1887 to the date of writing, May 1889. A few names omitted from previous lists are also included.

The bibliography of recently published monographs and synopses renders it unnecessary to note the changes in synonymy and the danger of mistakes arising from the use of numbers is thus avoided.

LIST OF SPECIES.

CARABIDÆ.

Anillus.
9452. explanatus Horn.

Pterostichus.
9453. johnsoni Ulke.

SCYDMÆNIDÆ.

Cephennium.
9454. breve Schauff.

PSELAPHIDÆ.

Chennium.
Biotus Casey.
9455. formicarius Casey.

Tyrus.
Pytna Casey.
9456. corticina Casey.

Tychus.
9457. sonomæ Casey.
9458. bipuncticeps Casey.

Decarthron.
9459. brendeli Casey.

Nisaxis Casey.
9460. cincinnata Casey.
9461. maritima Casey.

Bryaxis.
9462. canadensis Brend.
9463. arizonæ Casey.

Anchylarthron Brend.
Verticinotus Brend.

Batrisus.
9464. cephalotes Casey.
9465. luculentus Casey.
9466. foveicornis Casey.
9467. punctifrons Casey.
9468. spinifer Brend.

Actium Casey.
9469. pallidum Casey.
9470. politum Casey.
9471. robustulum Casey.
9472. testaceum Casey.

Conoplectus Brend.

Eurhexius Sharp.
Rhexidius Casey.
9473. granulosus Casey.

---

* For the First Supplement see Ent. Amer., 1887, Vol. 2, pp. 213—220.

Trogaster Sharp.
Oropus Casey.
9474. montanus Casey.
Euplectus.
9475. californicus Casey.
Faronus.
Sonoma Casey.
9476. corticina Casey.
9477. cavifrons Casey.

STAPHYLINIDÆ.

Gymnusa.
9478. variegata Kiesw.
Quedius.
9479. erythrogaster Mann.
Trogophlœus.
9480. anthracinus Casey.
9481. corvinus Casey.
9482. dentiger Casey.
9483. mexicanus Casey.
9484. texanus Casey.
9485. armatus Casey.
9486. gilæ Casey.
9487. prominens Casey.
9488. pacificus Casey.
9489. arizonæ Casey.
9490. occiduus Casey.
9491. conjunctus Casey.
9492. spretus Casey.
9493. apacheanus Casey.
9494. mancus Casey.
9495. spectatus Casey.
9496. imbellis Casey.
9497. lepidus Casey.
9498. diffusus Casey.
9499. lapsus Casey.
9500. egregius Casey.
9501. obliquus Casey.
9502. sculptilis Casey.
9503. difficilis Casey.
9504. congener Casey.
9505. agonus Casey.
9506. temporalis Casey.
9507. probus Casey.
9508. nanulus Casey.
9509. modestus Casey.
9510. pertenuis Casey.
9511. detractus Casey.
9512. indigens Casey.
9513. graphicus Casey.
9514. ingens Casey.
9515. incertus Casey.
9516. delicatus Casey.
9517. pudicus Casey.
9518. robustulus Casey.
9519. confinis Casey.
9520. pauperculus Casey.
9521. languidus Casey.
9522. bipuncticollis Casey.
9523. pallidulus Casey.
9524. debilis Casey.
9525. fallax Casey.
9526. providus Casey.
9527. inquisitus Casey.
9528. facetus Casey.
9529. confusus Casey.
9530. scrupulus Casey.
9531. insolitus Casey.
9532. filum Casey.
9533. decoloratus Casey.
9534. tantillus Casey.
Apocellus.
9535. cognatus Sharp.

SCAPHIDIIDÆ.

Scaphidium.
9536. antennatum Reitt.
Cyparium.
9537. substriatum Reitt.
Scaphisoma.
9538. impunctatum Reitt.
9539. læve Reitt.

CRYPTOPHAGIDÆ.

Cœnoscelis.
9540. cryptophaga Reitt.

DERMESTIDÆ.

Orphilus.

9541. ater Er.

NITIDULIDÆ.

Soronia.

9542. schwarzii Ulke.

HETEROCERIDÆ.

Heterocerus.

9543. americanus Sharp.
9544. vilis Sharp.

ELATERIDÆ.

Cardiophorus.

9545. bifasciatus Blanch.
9546. coxalis Blanch.
9547. pullus Blanch.
9548. gemnifer Blanch.
9549. abbreviatus Blanch.
9550. angustatus Blanch.
9551. nevadensis Blanch.
9552. crinitus Blanch.
9553. pubescens Blanch.
9554. carbonatus Blanch.
9555. seniculus Blanch.
9556. dispar Blanch.

BUPRESTIDÆ.

Chrysobothris.

9557. costifrons Waterh.

MALACHIDÆ.

Listrus.

9558. punctatus Mots.

Dasytes.

9559. catalinæ Lec.

CIOIDÆ.

Cis.

9560. tetracentrum Gorh.

SCARABÆIDÆ.

Ægialia.

9561. rufescens Horn.
rufa || Lec.
9562. blanchardi Horn.
9563. pusillus Horn.
9564. opifex Horn.

Psammodius.

9565. nanus DeGeer.
9566. hydropicus Horn.

Pleurophorus.

9567. ventralis Horn.

Atænius.

9568. californicus Horn.
9569. cognatus Lec.
9570. strigatus Say.
9571. inquisitus Horn.
9572. wenzelii Horn.
9573. læviventris Horn.
9574. inops Horn.
9575. texanus Har.
9576. lecontei Har.
9577. insculptus Horn.

Aphodius.

9578. ovipennis Horn.
9579. tenuistriatus Horn.
9580. acerbus Horn.
9581. nanus Horn.
9582. depressus Kug.
9583. rufipes Linn.
9584. pumilus Horn.

9585. inutilis Horn.
9586. luxatus Horn.
9587. parcus Horn.
9588. larreæ Horn.
9589. luteolus Horn.
9590. æmulus Horn.
9591. haldemani Horn.
politus || Horn.
9592. decipiens Horn.
9593. gentilis Horn.
9594. consociatus Horn.
9595. conspersus Horn.

Geotrupes.
9596. ulkei Blanch.
9597. hornii Blanch.

Pleocoma.
9598. rickseckeri Horn.
9599. conjungens Horn.
9600. ulkei Horn.
9601. puncticollis Rivers.

Lachnosterna.
9602. hamata Horn.
9603. generosa Horn.
9604. prætermissa Horn.
9605. clemens Horn.
9606. hirtiventris Horn.
9607. postrema Horn.
9608. inversa Horn.
9609. bipartita Horn.
9610. vehemens Horn.
9611. grandis Smith.
9612. dubia Smith.
9613. arcuata Smith.
9614. insperata Smith.
9615. ulkei Smith.
9616. quadrata Smith.
9617. politula Horn.
9618. barda Horn.
9619. spreta Horn.
9620. nova Smith.
9621. infidelis Horn.
9622. luctuosa Horn.
9623. profunda Blanch.
9624. scitula Horn.
9625. hornii Smith.
9626. biimpressa Smith.
9627. longispina Smith.
9628. implicita Horn.
9629. innominata Smith.
9630. limula Horn.
9631. delata Horn.
9632. æmula Horn.
9633. arcta Horn.
9634. vetula Horn.
9635. fucata Horn.
9636. exorata Horn.
9637. ignava Horn.
9638. inepta Horn.
9639. affabilis Horn.
9640. clypeata Horn.
integra || Lec.
9641. boops Horn.
9642. ecostata Horn.
9643. antennata Smith.
9644. lenis Horn.
9645. heterodoxa Horn.
9646. tusa Horn.

Aphonides Rivers.
Anoplognatho || Rivers.
9647. dunniana Rivers.

Stephanucha Burm.
9648. pilipennis Kraatz.

CERAMBYCIDÆ.

Mecas.
9649. saturnina Lec.

CHRYSOMELIDÆ.

Longitarsus.
9650. nitidellus Cockr.

LAGRIIDÆ.

Statira.
9651. pluripunctata Horn.
9652. opacicollis Horn.
9653. basalis Horn.

MELANDRYIDÆ.

Mallodrya Horn.
9654. subænea Horn.
Hypulus.
9655. bicinctus Horn.
Eustrophus.
9656. arizonensis Horn.
9657. repandus Horn.
Holostrophus Horn.
9658. discolor Horn.
Orchesia.
9659. ornata Horn.

PYTHIDÆ.

Trimitomerus Horn.
9660. riversii Horn.

PYROCHROIDÆ.

Pyrochroa.
9661. fascicollis Mann.

RHYNCHITIDÆ.

Auletes.
9662. laticollis Casey.

OTIORHYNCHIDÆ.

Epicærus.
9663. texanus Casey.
9664. sulcatus Casey.
Stamoderes.
9665. uniformis Casey.
Ophryastes.
9666. shufeldti Casey.
9667. sulcipennis Casey.
Eupagoderes.
9668. dunnianus Casey.
Sapotes Casey.
9669. puncticollis Casey.
Rhigopsis.
9670. scutellata Casey.
Amotus Casey.
9671. longisternus Casey.
9672. gracilior Casey.
Peritaxia.
9673. perforata Casey.
Exomias.
9674. pellucidus Boh.
Amnesia.
9675. granulata Casey.
9676. tesselata Casey.
9677. sculptilis Casey.
Nocheles.
9678. vestitus Casey.
Miloderes.
9679. setosus Casey.
Sciopithes.
9680. significans Casey.
9681. brumalis Casey.
9682. arcuatus Casey.
9683. angustulus Casey.
9684. setosus Casey.
Stenoptochus Casey.
9685. inconstans Casey.
Orthoptochus Casey.
9686. squmiger Casey.
Peritelodes Casey.
9687. obtectus Casey.
Peritelinus Casey.
9688. variegatus Casey.
Geoderces.
9689. puncticollis Casey.
Geodercodes Casey.
9690. latipennis Casey.
Aragnomus.
9691. hispidulus Casey.
Thinoxenus.
9692. nevadensis Casey.
Panormus Casey.
9693. setosus Casey.

Elissa Casey.
9694. laticeps Casey.
9695. constricta Casey.
Pseudelissa Casey.
9696. cinerea Casey.
Scythropus.
9697. lateralis Casey.
9698. ferrugineus Casey.
9699. cinereus Casey.
9700. crassicornis Casey.

CURCULIONIDÆ.

Sitones.
9701. extrusus Casey.
9702. varians Casey.
9703. margaritosus Casey.
9704. procerus Casey.
9705. occidentalis Casey.
9706. eximius Casey.
9707. montanus Casey.
9708. nebulosus Casey.
9709. alternans Casey.
9710. osculans Casey.
9711. prominens Casey.
9712. hispidiceps Casey.
9713. angustulus Casey.
9714. explicitus Casey.
9715. apacheanus Casey.
9716. sparsus Casey.
Apion.
9717. lividum Smith.
Sciaphilus Sch.
9718. muricatus Fabr.
Strophosomus Billb.
9719. coryli Fabr.
Macrops.
9720. indistinctus Dietz.
9721. cryptops Dietz.
9722. hyperodes Dietz.
9723. nevadensis Dietz.
9724. grypidioides Dietz.
9725. wickhami Dietz.
9726. interpunctatulus Dietz.
9727. ulkei Dietz.
9728. dorsalis Dietz.
9729. tenebrosus Dietz.
9730. alternatus Dietz.
9731. montanus Dietz.
9732. interstitialis Dietz.
9733. hornii Dietz.
9734. setiger Dietz.
9735. subcribratus Dietz.
9736. longulus Dietz.
9737. rotundicollis Dietz.
9738. obscurellus Dietz.
9739. imbellis Dietz.
9740. hirtellus Dietz.
9741. echinatus Dietz.
9742. obtectus Dietz.
9743. myasellus Dietz.
9744. mirabilis Dietz.
9745. californicus Dietz.
9746. anthracinus Dietz.
Otidocephalus.
9747. pœyi Gyll.
Cryptorhynchus.
9748. lapathi Linn.
Ceutorhynchus.
9749. cyanipennis Ill.

CALANDRIDÆ.

Phlœophagus.
9750. spadix Hbst.

SCOLYTIDÆ.

Pityophthorus.
9751. concentralis Eich.
9752. manzanita Sz.
Trypodendron Steph.
9753. vittigerum Eich.
Thysanœs.
9754. ficus Sz.

BIBLIOGRAPHICAL REFERENCES.

Synonymical notes. Blanchard, Ent. Amer., 1887, v. 3, p. 85—88; Trans. Amer. Ent. Soc., 1885, v. 12, p. 169—172.

" " Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 3—5 Proc.; ibid., 1886, v. 13, p. 7—13 Proc.

" " Schwarz, Ent. Amer., 1887, v. 3, p. 13—14.

Species described by Beauvois. Ent. Amer., 1885, v. 1, p. 88—90.

" " " *Bland.* Trans. Amer. Ent. Soc., 1880, v. 8, p. 10—12 Proc.

" " " *Casey.* Ent. Amer., 1885, v. 1, p. 108—113.

" " " *Kirby.* Ca. Ent., 1876, v. 8, p. 126—130; 150—151; 166—170; 190—193.

" " " *Leconte J.* Trans. Amer. Ent. Soc., 1881, v. 9, p. 271—272.

" " " *Leconte, J. L.* Trans. Am. Ent. Soc., 1881, v. 9, p. 179—270.

" " " *Newman.* Ent. Amer., 1885, v. 1, p. 5—9; 52.

" " " *Randall.* Proc. Bost. Soc. Nat. Hist., 1875, v. 17, p. 373—385.

" " " *Walker.* Ann. Mag. Nat. Hist., 1870, ser. 4, v. 6, p. 399—402.

" " " *Ziegler.* Ca. Ent., 1885, v. 7, p. 131—132.

CICINDELIDÆ.

Monograph. Schaupp, Bull. Br. Ent. Soc., 1883—1884, v. 6, p. 73—108; 121—126, plates.

CARABIDÆ.

Anillus. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 26—27.

Anophthalmus. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 270—271.

Calathus. *Synoptic table.* Leconte, Bull. Br. Ent. Soc., 1883, v. 6. p. 49.

Lebia. *Synoptic table.** Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 133—134.

Agonoderus. *Synoptic table.* Leconte, Bull. Br. Ent. Soc., 1883, v. 6, p. 53—54.

Discoderus. *Synoptic table.* Horn, Bull. Br. Ent. Soc., 1883, v. 6, p. 52—53.

Stenolophus. *Synoptic table.* Leconte, Bull. Br. Ent. Soc., 1883, v. 6, p. 13—15.

Acupalpus. *Synoptic table.* Leconte, Bull. Br. Ent. Soc., 1883, v. 6, p. 15.

Bradycellus. *Synoptic table.* Leconte, Bull. Br. Ent. Soc., 1883, v. 6, p. 50.

Tachycellus. *Synoptic table.* Horn, Bull. Br. Ent. Soc., 1883, v. 6, p. 51—52.

Pseudomorpha. *Synoptic table.* Horn, Bull. Br. Ent. Soc., 1883, v. 6, p. 16; Trans. Amer. Ent. Soc., 1883, v. 10, p. 273.

HYDROPHILIDÆ.

Note. Horn, Ca. Ent., 1885, v. 17, p. 137—139.

Tropisternus. *Revision.* Sharp, Trans. Ent. Soc. Lond., 1883, p. 91—117.

Limnebius (Limnocharis). *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 167—171.

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* Incomplete.

SCYDMÆNIDÆ.

Eumicrus. *Synoptic table.* Casey, Cont. Col., 1884, pt. 2, p. 87.

PSELAPHIDÆ.

New species. Casey, Bull. Cal. Acad. Sci., 1887, v. 2, p. 455—482, plate.

Corrections. Brendel, Trans. Amer. Ent. Soc., 1887, v. 14, p. 204—208.

Synopsis of genera. Brendel, Trans. Acad. Sci. St. Louis, 1888, v. 5, p. 298—302.

Bryaxis (Reichenbachia). *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 186—195.

Trogaster (Oropus). *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 196—201.

Thesium. *Synopsis.* Casey, Cont. Col., 1884, pt. 2, p. 117—119.

Euplectus. *Synopsis.* Casey, Cont. Col., 1884, pt. 2, p. 94—117.

STAPHYLINIDÆ.

Colusa. *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1885, v. 1, p. 288—296.

Pontomalota. *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1885, v. 1, p. 296—299.

Philonthus. *Monograph.* Horn, Trans. Am. Ent. Soc., 1884, v. 11, p. 117—223.

Actobius. *Monograph.* Horn, Trans. Amer. Ent. Soc., 1884, v. 11, p. 223—234.

Cafius. *Monograph.* Horn, Trans. Amer. Ent. Soc., 1884, v. 11, p. 234—239.

Dianous. *Synopsis.* Casey, Rev. Stenini, 1884, p. 8—12.

Stenus. *Synopsis.* Casey, Rev. Stenini, 1884, p. 12—206.

Euasthetus. *Synopsis.* Casey, Cont. Col., 1884, pt. 1, p. 19—29.

Edaphus. *Synopsis.* Casey, Cont. Col., 1884, pt. 1, p. 29—31.

Cryptobium. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 85—106, plates.

Caloderma. *Revision.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 5—12.

Melon (Lithocharis). *Revision.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 14—29.

Lithocharis (Metaxyodonta). *Revision.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 29—32.

Trogophlœus. *Revision.* Casey, Ann. N. Y. Acad. Sci., 1889, v. 4, p. 322—383.

Apocellus. *Synopsis.* Casey, Cont. Col., 1884, pt. 2, p. 153—161.

Amphichroum. *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 235—241.

Pelecomalium. *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 241—243.

Orobanus. *Synopsis.* Casey, Bull. Cal. Acad. Sci., 1886, v. 2, p. 245—248.

TRICHOPTERYGIDÆ.

Synopsis. Matthews, Trans. Amer. Ent. Soc., 1884, v. 11, p. 113—156.

COLYDIIDÆ.

Lasconotus. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 141—142.

CUCUJIDÆ.

Revision. Casey, Trans. Amer. Ent. Soc., 1884, v. 11, p. 69—112, plates.

ELATERIDÆ.

Melasis. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 6—8.

Tharops. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 8—9.

Stethon. *Descriptions.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 12—14.

Deltometopus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 15—17.

Dromæolus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 17—23.

Fornax. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 24—28.

Microrhagus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 29—37.

Hypocœlus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 44—45.

Nematodes. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 40—44.

Phlegon. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 47—48.

Cardiophorus. *Synopsis.* Blanchard, Trans. Am. Ent. Soc., 1889, v. 16, p. 1—27.

Horistonotus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1884, v. 12, p, 33—41.

Esthesopus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1884, v. 12, p. 41—44.

Elater. *Synoptic table.* Leconte, Trans. Amer. Ent. Soc., 1884, v. 12, p. 8—15.

Drasterius. *Synoptic table.* Leconte, Trans. Am. Ent. Soc., 1884, v. 12, p. 4—6.

Megapenthes. *Synoptic table.* Leconte, Trans. Am. Ent. Soc., 1884, v. 12, p. 6—8.

Ludius. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1884, v. 12, p. 45—49.

Agriotes. *Synoptic table.* Leconte, Trans. Am. Ent. Soc., 1884, v. 12, p. 15—19.

Eniconyx. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1884, v. 12, p. 51—52.

Perothops. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 53—54.

Cerophytum. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 50—52.

THROSCIDÆ.

Synopsis. Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 198—208.

BUPRESTIDÆ.

Gyascutus. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 287.

Hippomelas. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 288.

Anthaxia. *Notes.* Casey, Cont. Col., 1884, pt. 2, p. 172—175.

Chrysobothris. *Monograph.* Horn, Trans. Amer. Ent. Soc., 1886, v. 13, p. 65—124, plates.

Thrincopyge. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 147.

LAMPYRIDÆ.

Zarhipis. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 148.

LUCANIDÆ.

Platycerus. *Synoptic table.* Casey, Bull. Cal. Acad. Sci., 1885, v. 1, p. 332.

SCARABÆIDÆ.

Canthon. *Synopsis.* Blanchard, Trans. Am. Ent. Soc., 1885, v. 12, p. 163—167.

Chœridium. *Characters.* Blanchard, Trans. Am. Ent. Soc., 1885, v. 12, p. 170.

Phanæus. *Synopsis.* Blanchard, Trans. Am. Ent. Soc., 1885, v. 12, p. 167—169.

Ægialia. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 98—105.

Psammodius. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 92—98.

Pleurophorus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 90—92.

Rhyssemus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 87—90.

Atænius. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 67—86.

Dialytes. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 65—67.

Aphodius. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 2—64.

Geotrupes. *Synopsis.* Blanchard, Psyche, 1888, v. 5, p, 103—110.

Glaresis. *Descriptions.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 117—118.

Pleocoma. *Synoptic table.* Horn, Ent. Amer., 1888, v. 3, p. 233—235.
Review. Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 1—18, plates.

Lachnosterna. *Synonymical notes.* Horn, Ent. Amer., 1887, v. 3, p. 141—145.
Revision. Horn, Trans. Amer. Ent. Soc., 1887, v. 14, p. 209—296, plates.
Notes. Smith, Insect Life, 1888, v. 1, p. 180—185.
*Descriptions.** Smith, Ent. Amer., 1889, v. 5, p. 93—99.

Phytalus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 119—123.

Anomala. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1884, v. 11, p. 157—164.

Orizabus. *Descriptions.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 124—126.

Cremastochilus. *Synoptic table.** Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 126—128.

CERAMBYCIDÆ.

Synonymical notes. Gahan, Trans. Amer. Ent. Soc., 1888, v. 14, p. 299—300.

Mallodon. *Synoptic table.* Horn, Bull. Br. Ent. Soc., 1884, v. 7, p. 9—10.

Derobrachus. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 11.

Prionus. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 57—59.

Homæsthesis. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p, 57—59.

Asemum. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 62—63.

Criocephalus. *Synoptic table,* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 63—64.

Tetropium. *Characters.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 95—96.

Physocnemum. *Characters.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 97.

Hylotrupes. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 98.

Phymatodes. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 98—101.

Callidium. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 112—113.

Xylocrius. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 113—114.

Oeme. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1884, v. 7, p. 116.

Achryson. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1885, v. 7, p. 117.

Gracilia. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1885, v. 7, p. 118.

Brothylus. *Synoptic table.* Leng, Bull. Br. Ent. Soc., 1885, v. 7, p. 119.

Eburia. *Synoptic table.* Leng, Ent. Amer., 1885, v. 1, p. 28—29.

Romaleum. *Synoptic table.* Leng, Ent. Amer., 1885, v. 1, p. 29—31.
Notes. Horn, Ent. Amer., 1885, v. 1, p. 130.

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* Incomplete.

Elaphidion. *Synoptic table.* Leng, Ent. Amer., 1885, v. 1, p. 31—34.

Aneflus. *Synoptic table.* Leng, Ent. Amer., 1885, v. 1, p. 34—35; Horn, ibid., p. 131—133.

Compsa. *Synoptic table.* Leng, Ent. Amer., 1885, v. 1, p. 134—135.

Heterachthes. *Synoptic table.* Leng, Ent. Amer., 1885, v. 1, p. 135.

Phyton. *Characters.* Leng, Ent. Amer., 1886, v. 2, p. 28.

Obrium. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 28.

Hybodera. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 28—29.

Callimus. *Characters.* Leng, Ent. Amer., 1886, v. 2, p. 29.

Molorchus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 30.

Callimoxys. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 29—30.

Rhopalophora. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 30—31.

Elytroleptus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 31—32.

Callichroma. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 61.

Stenaspis. *Characters.* Leng, Ent. Amer., 1886, v. 2, p. 62.

Crioprosopus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 62.

Tragidion. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 81.

Purpuricenus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 81—82.

Metaleptus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 82.

Æthecerus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 82.

Amannus. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 83.

Batyle. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 102.

Oxoplus. *Synoptic table.* Horn, Trans. Am. Ent Soc., 1885, v. 12, p. 175—176; Leng, Ent. Amer., 1886, v. 2, p. 102—103.

Tylosis. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 118.

Crossidius. *Synoptic table.* Leng, Ent. Amer., 1886, v. 2, p. 118—119.

Stenosphenus. *Synopsis.* Horn, Trans. Am. Ent. Soc., 1885, v. 12, p. 177—180. *Synoptic table.* Leng, Ent. Amer., 1887, v. 2, p. 193—194.

Cyllene. *Synoptic table.* Leng, Ent. Amer., 1887, v. 2, p. 195—197.

Calloides. *Synoptic table.* Leng, Ent. Amer., 1887, v. 2, p. 197.

Clytus. *Synoptic table.* Leng, Ent. Amer., 1887, v. 2, p. 198.

Xylotrechus. *Synopsis.* Leng, Ent. Amer., 1887, v. 2, p. 198—200; v. 3, p. 4.

Neoclytus. *Synopsis.* Leng, Ent. Amer., 1887, v. 3, p. 4—8.

Clytanthus. *Characters.* Leng, Ent. Amer., 1887, v. 3, p. 23.

Euderces. *Synopsis.* Leng, Ent. Amer., 1887, v. 3, p. 24; 44.

Monilema. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 180—190.

Monohammus. *Synopsis.* Horn, Trans. Am. Ent. Soc., 1885, v. 12, p. 190—193.

Dorcaschema. *Synoptic table.* Horn, Trans. Am. Ent. Soc., 1885, v. 12, p. 194.

Goes. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 193.

Eupogonius. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 196.

Oncideres. *Synoptic table.* Horn, Trans. Am. Ent. Soc., 1885, v. 12, p. 194—195.

Dysphaga. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 197.

CHRYSOMELIDÆ.

Chrysochus. *Synoptic table.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 156.
Graphops (Scelodonta). *Synoptic table.* Leconte, Trans. Amer. Ent. Soc., 1884, v. 12, p. 26—27.
Halticinæ. *Notes.* Jacoby, Trans. Amer. Ent. Soc., 1888, v. 14, p. 302—303; Horn, ibid., p. 303-304.
Microrhopala. *Synopsis.* Horn, Trans. Am. Ent. Soc., 1883, v. 10, p. 290-294.
Odontota. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 294—298.
Charistena. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 298—299.
Octotoma. *Descriptions.* Horn, Trans. Am. Ent. Soc., 1883, v. 10, p. 299—300.
Stenispa. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 301—302.

BRUCHIDÆ.

Zabrotes. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 156—159.

TENEBRIONIDÆ.

Eusattus. *Synoptic table.* Horn, Trans. Am. Ent. Soc., 1883, v. 10, p. 304—305.

LAGRIIDÆ.

Synopsis. Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 28-32.

MELANDRYIDÆ.

Hypulus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 39—42.
Eustrophus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 32—35.
Holostrophus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 36—37.
Orchesia. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 37—38.

PYTHIDÆ.

Pytho. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 45—46.

ANTHICIDÆ.

Corphyra. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 305—310.
Notoxus. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 165—174.
Mecynotarsus. *Synopsis.* Horn, Trans. Am. Ent. Soc., 1884, v. 11, p. 175—176.

PYROCHROIDÆ.

Dendroides. *Synopsis.* Horn, Trans. Amer. Ent. Soc., 1888, v. 15, p. 46—48.

MELOIDÆ.

Macrobasis. *Synoptic table.* Horn, Trans. Am. Ent. Soc., 1885, v. 12, p. 109—110.
Tetraonyx. *Synoptic table.* Horn, Trans. Am. Ent. Soc., 1885, v. 12, p. 116.
Pyrota. *Descriptions.* Horn, Trans. Amer. Ent. Soc., 1885, v. 12, p. 112—115.
Cantharis. *Synoptic table.** Horn, Trans. Amer. Ent. Soc., 1883, v. 10, p. 311.

OTIORHYNCHIDÆ.

Epicærus. *Synoptic table.* Casey, Ann. N. Y. Acad. Sci., 1888, v. 4, p. 234.
Amotus. *Synoptic table.* Casey, Ann. N. Y. Acad. Sci., 1888, v. 4, p. 244.
Amnesia. *Synoptic table.** Casey, Ann. N. Y. Acad. Sci., 1888, v. 4, p. 247.
Sciopithes. *Synoptic table.** Casey, Ann. N. Y. Acad. Sci., 1888, v. 4, p. 254.
Elissa. *Synoptic table.* Casey, Ann. N. Y. Acad. Sci., 1888, v. 4, p. 272.
Scythropus. *Synoptic table.** Casey, Ann. N. Y. Acad. Sci., 1888, v. 4, p. 275.

CURCULIONIDÆ.

Apioninæ. *Synopsis.* Smith, Trans. Am. Ent. Soc., 1884, v. 11, p. 41—68, plate.
Balaninus. *Synoptic table.* Blanchard, Bull. Br. Ent. Soc., 1884, v. 8, p, 106—108.

SCOLYTIDÆ.

Notes. Schwarz, Ent. Amer., 1886, v. 2, p. 40—42; 54—56.

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* Incomplete.

Note on Fornax calceatus *Say*, and F. Hornii *Bonv.*, and on Corymbites divaricatus *Lec.*, and C. crassus *Lec.*

By Frederick Blanchard.

Mr. Chas. Dury has mentioned in Ent. Amer., vol. IV, p. 163, that *Fornax Hornii* is the ♀ of *calceatus*. I had not identified the former, but on exhibiting to Dr. Horn a series of *calceatus*, assorted according to sex, he at once remarked that the ♀ was what is described as *Hornii*. The antennæ are slender and filiform, in the ♂ reaching three joints beyond the hind angles of the thorax and as far as the hind coxæ, but in the ♀ only extending one joint behind the thoracic angles; the second joint is inserted beneath the apex of the first so as to be partly hidden from above, when observed from below, however, in the ♂, the second, third and fourth joints appear to be about equal in length, or the third may be a trifle longer; in the ♀, the third joint is quite distinctly longer than the second or fourth, and on this difference chiefly, is based the name *Hornii*; the second joint is not really shorter than in the ♂, but it looks shorter in comparison with the greater length of the third.

I observe that in this species and also in three species of *Dromæolus*, *basalis*, *cylindricollis* and *striatus*, which are before me, all having filiform antennæ, that the thighs are rather deeply grooved and broad at the apex, the lower angle being laminiform and partly protecting the tibiæ in repose. In *Dromæolus pusillus*, having serrate antennæ, the thighs though grooved beneath for the reception of the tibiæ are narrowed at tip without distinct expansion of the angle. In *Fornax calceatus* the claws are also simple as in *Dromæolus*; the coxal plates are strongly dilated inwardly and usually strongly angulate, but specimens occur with the posterior inner angle considerable rounded. The ♂ has the thorax more narrowed in front; the lateral pieces of the ♂ intromittent organ have a hook-like barb at tip.

The larger female greatly exceeds the male in size, the ♂ being 4.5—5 mm., and the ♀ 5—7 mm.

The species occurs rather abundantly in Mass. and N. Y., under bark of pine stumps in May.

The only other species of *Fornax* at hand as I write is *orchesides*, which has toothed claws, the antennæ are strongly serrate and do not differ appreciably in the sexes, the second joint is here really very short while the third is longer than the fourth and equally broad. The eyes encroach more upon the antennal grooves than in *calceatus*, in fact completely occupying them. The thighs are grooved beneath, but narrowed at tip and not distinctly laminate. The ♂ organ has the barbs of the corneous lateral valves very remote from the tips.

From the foregoing it would seem that *F. calceatus* is more nearly allied to certain *Dromæolus* than to *F. orchesides.*

Corymbites divaricatus Lec.—On comparing notes with Mr. Ulke it was observed that the ♀ of this species is the *crassus* of Leconte. Although placed in different sections of the genus the suggestion of their identity once made, the conclusion is inevitable. The ♂ antennæ are serrate and longer than the head and thorax, the second joint is shorter and thicker than the third, the third is a little shorter than the fourth, gradually thicker towards the tip, but not broad like the fourth and following joints. The thorax of the ♂ is much narrower than the elytra, the sides straight or nearly so, gradually diverging from apex nearly to the base, thence the angles are produced and very strongly diverging. The elytral striæ are about as wide as the intervals and with close, deeply impressed, quadrate punctures. In the male the body is much inflated, generally darker in color, piceous above and beneath and more shining. The thorax is very convex and as wide as the base of the elytra, and the angles but feebly diverging. The antennæ are about two-thirds as long as in the ♂, very feebly serrate, the fourth and following joints much shortened and hence the third joint is quite as long as the fourth, but narrower. The tarsi, especially the anterior ones, are shorter in the ♂.

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To Whom it May Concern.

Editor Entomologica Americana:

In a recent issue you mention that Prof. Fernald contemplates a visit to Europe the present Summer in order to examine types, and by way of comment object to the wholesale American type-making over there. Your views startle me! I have somehow received the impression that "Gattung- und Arten-macherei" was the highest ambition of the entomologist, and to rob our transatlantic confreres of that sweet satisfaction would be cruel. And beside, what have types to do with the matter; they would only the sooner consign the myriads of mihis to the maelstrom of synonyms.

In the recent transactions of the French Entomological Society there are "diagnoses" of eighty-six "new" species of Diptera, nearly all North American *Tachinidæ* and *Dexidæ.* They average about sixty words to the "description," and some of them do not exceed fifteen. Now, while it may be true that the species of these families are easily recognizable from descriptions, so much so that hardly any one ever takes the troubte to determine them at all, yet I would very respectfully submit that a few words more, or at least some vague intimation that other species of the family had been previously described, might throw some light upon their synonymy. Palæontologists may properly erect a new species on a fossil foot, but when the entomologist attempts the same with a fly's foot, or other *membra disjecta*, one can only ask that the author give, at least, a good description of the claws.

It is probable that the above mentioned Latin diagnoses will be followed sometime in the future by French translations, and the author will then add eighty-three more mihis to his already plethoric list of North American "species." Mr. Léveillé, at a recent séance of the Society, proposed that it should form a collection of types, especially of the insects described in the Annales. I can assure him that a collection of such types as the above mentioned flies will be in great demand—for the determination of synonyms, or for purposes of description. The *Tachinidæ* are such an attractive family of insects that it shows much prudence in publishing diagnoses, and thus saving the mihis. The half dozen active dipterologists of the world are probably all looking with envious eyes at the author's good-fortune.

But the subject takes one's breath away; it can only be characterized by a very big O ! !

New Haven, May 25, 1889. S. W. Williston.

NOTE BY EDITOR.

Dr. Williston speaks feelingly and we sympathize with him. We have been in precisely the same frame of mind, and can testify that nothing is so certain to make a man unutterably weary and to force him to the conviction that after all marriage is a failure, as the receipt of a paper containing a lot of "new species," just about the time when one begins to feel that light is ahead and the weary work of making the acquaintance of adamized species at an end. If a paper be really good, this feeling does not exist. We refer only to the variety (it may be a species) which seems to have aroused Dr. Williston's ire, where you can read the "diagnoses" forward, backward and from the middle, without being at all clear whether after all the characters given apply to twenty, or only to fifteen species. The matter ought really to be brought to the attention of the Society for the Suppression of Vice, or some similar society, for I am quite certain that a more vicious condition of mind could not possibly be aroused even by an undraped cigarette picture than by such a publication as mentioned by Dr. Williston!

NOTES ON HETEROCERUS.

By Geo. H. Horn, M. D.

While attempting to bring order in an overcrowded box in my cabinet, the specimens of *Heterocerus* had to be removed and their replacement elsewhere has cost me some little trouble in an attempt to assort the specimens specifically. While I have not yet been able to satisfy myself as to the validity of some of Kiesenwetter's species, certain points of some interest have been developed.

H. pusillus Say, *limbatus* Kies., *luteolus* Lec. This species is remarkable in that the ♂ has at the base of the mandibles a lobe which overlaps the labrum, nearly meeting. This is our smallest species and is very widely distributed. Dr. Hamilton takes it at Allegheny, Pa., and I have it from Kansas, Texas, Arizona, Southern California and Mexico.

H. pallidus Say. This is the large pale species taken rather abundantly by Prof. Snow in Kansas and N. Mex., extending also to Arizona and Texas.

Three species have been observed in which the labrum, ♂, is more or less produced at middle—*labratus*, *ventralis* and *pallidus*.

It is my hope to make it possible to determine our species, but the difficulty of obtaining specimens from the region east of the Mississippi is a great draw-back. No one seems to have collected them, and one or two specimens by themselves are of little use.

From the western regions (Cal., Ariz., Tex.,) there is an abundance of material. If those who can collect them will take as many as possible and thereby assist in the work I have in hand, all will be benefited.

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Book Notices.

Bulletin No. 1, of the Office of Experiment Stations, U. S. Department of Agriculture is at hand, and contains the organization of the various stations and matter of interest necessarily to entomologists. In a late number of Entomologica Americana there was published a list of the entomologists of the experiment stations which is rather incomplete and not quite accurate. The receipt of this bulletin makes a more complete list possible.

Arkansas—C. W. Woodworth, B. S., ...Little Rock, Arkansas.
*California—F. W. Morse, ...Berkeley, Cal.
Connecticut—Has no entomologist, but Dr. Roland Thaxter, the mycologist, is well known as a good Lepidopterist, and prob-

ably does what is necessary. The station is at New Haven, Conn.

Dakota—J. H. Orcutt, M. D., Ph. D., ...Brookings, Dak.
Delaware—M. H. Beckwith, ... Newark, Del.
Florida—Jos. N. Neal, ...Lake City, Fla.
Georgia—J. P. Campbell, Ph. D., ...Athens, Ga.
Illinois—Has no entomologist on the station staff, but Prof. S. A. Forbes, Champaign, Ill., is state entomologist, and Dr. Selim Peabody, director of the Station at Champaign, is an entomologist of excellent standing.
Indiana—F. M. Webster, ...Lafayette, Ind.
Iowa—C. P. Gillette, M. Sc., ... Ames, Iowa.
Kansas—Edwin A. Popenoe, A. M., ...Manhattan, Kans.
Maine—F. M. Harvey, M. Sc., ...Orono Maine.
Massachusetts—Chas. H. Fernald, Ph. D., ...Amherst, Mass.
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Charles B. Cook, B. S., } " " "
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Nebraska—Lawrence Bruner, ...Lincoln, Nebr.
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New York—J. H. Comstock, B. S., ...Ithaca, N. Y.
Prof. J. A. Lintner, State entomologist, ..Albany, N. Y.
Ohio—Clarence M. Weed, B. Sc., ...Columbus, Ohio.
South Carolina—G. F. Atkinson, Ph. B., ...Columbia, S. C.
*Texas—M. Francis, ...College Station, Tex.
Tennessee—Henry E. Summers, B. S., ...Knoxville, Tenn.
Vermont—G. H. Perkins, Ph. D., ...Burlington, Vt.
Virginia—William B. Alwood, ...Blacksburg, Va.

* From a list published in April number of Psyche.

We should be pleased to be kept informed of additions to or changes in this list, and should be pleased also if these gentlemen would send their publications to the Brooklyn Entomological Society so that their works may become known to our members. J. B. S.

* * *

Injurious and other Insects of the State of New York, by J. A. LINTNER, Ph. D., State Entomologist.

We have received from the author the *Fourth Annual Report.* The preceding reports were among the best of their kind published in this country, and have placed Dr. Lintner among the highest as a careful and reliable observer. The present report is a worthy companion to those that have preceded it. It is most excellent in the value of its information, and the methods in which that information is presented. Some thirty species are treated of quite at length, and many brief notes are given. The author, page 44, describes as new, *Aulacomerus lutescens,* and gives drawings of larva and imago. G. D. H.

Society News.

At the June (10th,) meeting of the American Entomological Society, Dr. Horn stated that a professional sister had brought him some small beetles which a patient of hers declares issue from little pustules on her body, each in a little lump of pus. The beetles are *Lathridiids* and Dr. Horn declared it an utter impossibility not only that they should have developed in the closed pustules but that the beetle could sustain life in them. It is a case of voluntary or involuntary deception of the physician by the patient, such as one must constantly guard against. Prof. J. B. Smith gave some examples of similar instances of voluntary or involuntary deception prominent among which are the many cases of larvæ of *Eristalis tenax* said to have been passed by patients, and one case where a large living Cerambycid larva was said to have been vomited. All these cases, when sifted, leave, as in the spider bite cases, a considerable element of doubt. A discussion was started on the unreliability of lay testimony, in which Drs. Mc. Cook, Skinner and Castle took part, in which were related cases of spider bites sifted, and a case where a lizard, said to have been living for a long time in the body of a patient, was dissected, and in which were found abundant undigested remains of insects of several orders.

Dr. Skinner gave the results of some observations made by Mr. Aaron and himself on the oviposition of *Argynnis* and he finds that all observed species drop their eggs while hovering over the food plant, and do not oviposit on leaves.

Prof. Smith called attention to the fact that *Crioceris asparagi* stridulates, and describes the stridulating organ. The fact is well known in Europe, but has not been noted before in this country.

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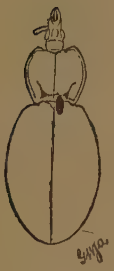
A Curious Deformity in Cychrus.



A male specimen of *Cychrus nitidicollis* Chev., var. *brevoorti* Lec., collected by Morrison in North Carolina, presents a curious deformity. As shown in the figure, the thorax and base of the elytra are connected by an oval, slightly flattened tubercle rigidly uniting the two, and thus preventing the normal movements of the thorax.

G. W. J. Angell.

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Rhinebeck, N. Y., June 10, 1889.

Dear Sir:—I noticed in the May number of "Ent. Amer." a method of relaxing Lepidoptera by means of alcohol, which I have tried during the past week. I used a bowl with alcohol in the bottom, a wire gauze to hold the specimens, and covered with a plate. It worked well, much better than water, and I found that specimens relaxed better, dried quicker, and were not moulded. I wish to thank you for the suggestion.

Harrison G. Dyar.

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Address **W. J. HOLLAND**, Ph. D., 5th Ave., Pittsburgh, Pa.

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CONTRIBUTIONS TOWARD A MONOGRAPH OF THE NOCTUIDÆ OF TEMPERATE NORTH AMERICA: GENUS OLIGIA *HÜBNER.**

By John B. Smith.

Genus **OLIGIA** *Hübner.*

Verzeichniss bek. Schmett. 404.

Mr. Grote characterizes the sub genus *Oligia*, as follows:—"A slight form, allied to *Hadena*, apparently distinguishable by the more curved divaricate labial palpi. Antennæ in the male simple, pubescent beneath. Eyes naked with short black lashes. The thoracic squamation consists of narrow scales. Maxillæ rather weak. Abdomen linear; collar broad; thorax crested behind; front broad, exceeded by the palpi. Legs unarmed; the median spurs of hind tibiæ situate without the middle of the joint." To this may be added that the wings are obtuse, and that the anal tuft of the male is rather larger than usual. The genus is not a strongly characterized one, and its characters are mostly negative. The species are small in size, closely scaled as a rule, the maculation usually distinct, and the t. p. line always even *and a little outwardly oblique from costa*—this latter being rather an unusual character and distinctive of the genus.

Of the species listed in our catalogues those described by Guenée have never before been satisfactorily identified, and several different forms have done duty as Hübner's *chalcedonia*. By careful comparisons of long series of specimens with the descriptions, I have succeeded in definitely fixing the species intended by both Hübner and Guenée.

At the head of this series comes *festivoides*, distinguished by shorter, comparatively broader primaries, bright color, and large, oblique reniform, outwardly deeply indented and black marked. In common with the two following species this has a pale apical spot, and a well marked claviform.

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* See Ento. Amer., vol. V, 105, for introduction to this series.

Chalcedonia is narrower-winged with similar maculation, save that the reniform is smaller, and narrow ; the costal region is also pale as a rule. The secondaries are white, hyaline, in both sexes.

Exesa is larger and more robust, more evenly colored ; but else very like *chalcedonia* in maculation. The secondaries are fuscous brown.

The other species lack the apical pale spot and the claviform, the type of maculation being otherwise the same.

Fuscimacula is a very pretty, evenly colored species, grayish fuscous, the lines broad, pale and well defined, and the ordinary spots dusky.

Grata, or *rasilis* as it is generally named, is red-brown, the median lines narrow and white, reniform strongly constricted, with a dusky spot above and below.

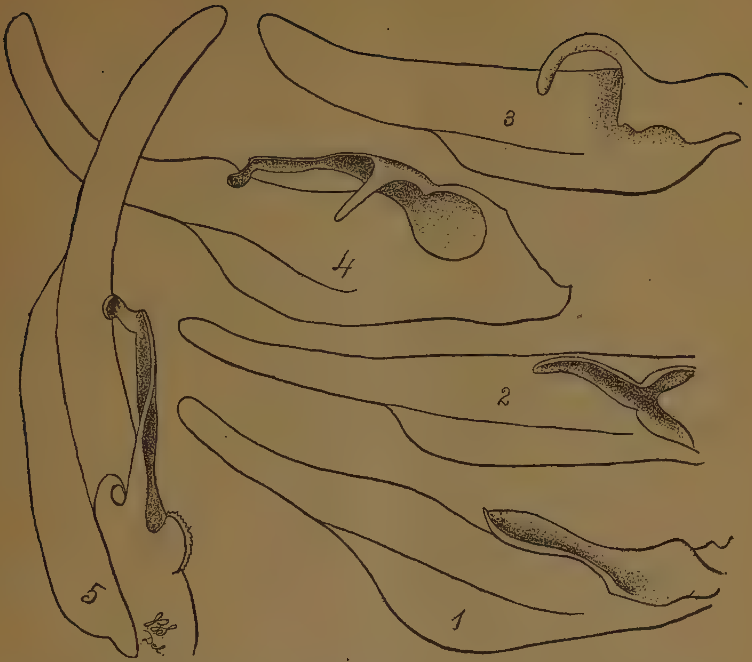
Paginata is dull, smoky fuscous, the maculation obscure and only the median lines well marked and dark—decidedly different from all allied forms.

Versicolor Grt., is known to me in nature, and I have given the description a place next to *chalcedonia* which it seems most nearly allied to, not having been able to obtain a specimen for study at the time of writing.

In synoptic form the species will appear as follows :

Apical spot and claviform present.
  Reniform large, oval, indented outwardly and black marked ; primaries proportionately shorter and broader.......... **festivoides**
  Narrower winged, reniform smaller and narrow.
    Size smaller, costa usually discolorous paler, secondaries hyaline, whitish in both sexes.......... **chalcedonia**
    Size larger, color more even, secondaries fuscous brown.......... **exesa**
Primaries without claviform or pale apical spot.
  Ground color yellowish-gray or fuscous, ordinary spots dusky, median lines broad, paler, well defined.......... **fuscimacula**
  Ground color red-brown, median lines narrow, pale ; reniform strongly constricted, with a dusky spot above and below.......... **grata**
  Dull smoky fuscous, maculation obscure ; median lines dark broad...... **paginata**

The species all agree in the general type of male genitalia. In all the harpes (which I have heretofore called the "side pieces"—for my term supra-anal plate I shall hereafter use the term *uncus*,) are elongate, narrow, with a rounded tip, somewhat curved, and broadening suddenly toward base, where the clasper is inserted. This latter is very various in form and will be described with the species.



Harpes and claspers of 1.—*O. festivoides*; 2.—*O. exesa*; 3.—*O. chalcedonia*; 4.—*O. fuscimaculata*; 5.—*O. grata*.

O. festivoides Guen., Noct. 1, 220, *Celæna*, 1852; Grt., Bull. Surv. 6, 261, *Oligia*; Wlk., Cat. B. Mus., Het. X, 261 (1856), *Celæna*.

Head and thorax carneous gray, collar a rich dark brown. Primaries a fine vinous brown or red, the basal and costal region suffused with carneous gray. T. a. line upright, feebly sinuous, geminate, more or less obliterated by the gray suffusion but sometimes very distinct. T. p. line geminate, bent over reniform on costa then straight to internal margin, accompanied by a more or less evident gray shade. Claviform present, small, pale, dark ringed, rarely complete, often entirely obscured, but usually the lower half visible. Reniform rather large, oblique, deeply indented outwardly, pale, the superior portion usually merged into the pale costal shade. Between the reniform and the t. p. line is a black spot, which extends round the interior margin of the reniform, and between it and the orbicular to the costal pale shade. A somewhat yellowish apical patch before which there is a darker patch on costa; from this the irregular, pale, and interrupted s. t. line extends through the darker terminal space. A row of black terminal spots. Secondaries in the male hyaline at base, the veins and outer margins smoky; in the female smoky. Beneath, primaries glistening, smoky brown, secondaries paler, powdery and with a distinct discal spot.

Expands, .88—1.00 inch. = 22—25 mm.

Habitat.—Can. to Fla. to Texas, West to the Mississippi.

A decidedly variable and yet characteristic species. It is always readily recognizable by the brown collar and the large, oblique reniform, outwardly deeply indented and black marked. There is also more or less black between the ordinary spots. The female is very often quite uniform in color, the markings disappearing in the uniform soft gray tint, and the characteristic reniform alone showing prominently—from this form to the typical strongly marked male all intergrades are present.

This is the species most usually marked *chalcedonia* in collections, and which I have heretofore so determined. I have not seen *festivoides* identified in collections but am quite certain that this is the species intended by Guenée. His description tallies in all points.

The wings are comparatively somewhat shorter and broader than in the other species. The harpes of the male are as in the other species; the clasper consists of a moderately long spoon-shaped corneous process with a little acute hook at tip. The species is common throughout the middle states, extending to Texas in the south-west and probably to the Rocky Mountains, though I have seen no specimens from further west than Missouri.

O. chalcedonia Hbn., Eur. Schmett., 404, *Oligia*; Treit., Eur. Schmett., 1, 74 (1816) *Bryophila*; Walk., Cat. B. Mus., Het. X, 262 (1856) *Celæna.*

vincta Wlk., Cat. B. Mus., Het., XII, 730, *Miana*; Grt., Ill. Essay, 44, pr. syn.

irresoluta Wlk., Cat. B. Mus., Het. XII, 731, *Celæna*; Grt., Ill. Essay, 45, pr. syn.

tracta Grt., Proc. Ac. N. Sci., Phil., 1874, 204, *Oligia* an var. pr.; Harvey, Bull. Buff. Soc. N. Sci., III, 7, pr. syn.; Grt., Bull. U. S. Geol. and Geog. Surv., VI, 265, (*Hadena*), an var. pr.

arna Gn., Noct. I, 222, (1852) *Celæna*; Walk., Cat. B. Mus., Het. X, (1856) 262, *Celæna*; Harv., Bull. Buff. Soc. N. Sci., III, 7, (*Oligia*).

Head, thorax and primaries grayish-brown, the costal region of primaries paler, and sometimes head, thorax and basal and costal region of primaries luteous, the remainder of wing then of the more usual sober brown. Basal line, when present, geminate; darker brown—in pale specimens the line is wanting. T. a. line geminate, outwardly oblique and somewhat sinuate, the included space somewhat paler. In pale specimens the line is wanting either in part or entirely. T. p. line outwardly bent over reniform, then somewhat sinuate, but as a whole outwardly oblique to the hind margin. It is geminate, the inner line distinct, the outer fainter, sometimes punctiform. The line is accompanied by a broad, diffuse whitish shade band, most distinctly marked on costa and very variably distinct below that point. Beyond this band the wing is somewhat evenly colored, broken into only by the pale, luteous apical patch, from which starts the more or less obsolete s. t. line which is pale, broken and irregular. Claviform small, pale, oval, very much of a size and form with the orbicular, which is often quite indistinct or even absorbed by the pale shading. Reniform small, oblique, a trifle paler, black ringed. A black mark between it and orbicular and another between it and t. p. line. Secondaries white, hyaline, with margins soiled and smoky. Beneath pale, powdery, with a distinct outer line. Collar with a central, darker transverse line.

Expands, .88—1.05 inches. 22—26 mm.

Habitat—Md. to Fla., to Texas.

A decidedly variable species within certain limits, as to size, maculation and color. Sometimes it will be of an almost even dull fuscous brown, the costa but slightly paler, the maculation indefinite; then it will appear with bright distinct markings and even colors, and again with the entire base and costal portion of wing discolorous bright luteous, absorbing all the basal maculation. Between these there is every shade of variation—in fact scarcely two specimens of the large series before me are even nearly alike.

The type form as figured by Hübner represents a specimen with the costa moderately pale, and otherwise well marked: *tracta* Grt., is based on specimens in which the pale shading encroaches still more on the center of the wing, and is simply a somewhat more marked specimen of the type form, while *arna* Gn., is evidently based on well marked specimens in which the costa is concolorous. Consequently *chalcedonia*, *tracta* and *arna* all refer to the same species—*arna* perhaps retainable as a poor variety.

The genitalia are as to harpes of the usual type. The clasper consists of a broad corneous base from which is projected a rather large, sickle-shaped hook.

The insect is common in the southern states and finds its centres of greatest abundance in Texas and Florida.

Hadena (Oligia) versicolor Grote, Proc. Acad. Nat. Sci., Phil., 1874, p. 204; Can. Ent., 1875, v. 7, pl. 1, f. 11.

"Dark brown with a more or less decided ruddy tinge. Primaries shaded with ochreous along internal margin, and with a well sized distinct deeper ochreous apical patch. Ordinary lines obsolete, whitish, broken by black points on the veins; the t. p. line emanates from a distinct and large white spot on the costa above the vague reniform, which latter is preceded by a distinct black shade on the disk, an evident feature of the ornamentation of the wing. Hind wings uniform pale fuscous, silky; beneath as above with a discal dot and distinct darker median shade line. Fore wings beneath blackish with traces of the continuation of the median line, paler terminally. Head and collar brownish; tegulæ paler; thoracic crestings tipped with blackish." Expanse, 20 mm.

Habitat—St. Catherine's, Ontario; N. Y. June.

This species I have identified in at least two collections but cannot recollect where. It struck me as a very distinct form, readily recognizable from the description and figure. It is perhaps nearest to some forms of *arna*, but has a *habitus* quite different.

O. exesa Gn., Noct. 1, 222, (1852), *Celæna*; Wlk., Cat. B. Mus., Het. X, 262, (1856) *Celæna*; Grote in Lists, *Hadena* § *Oligia*; Bull. U. S. Geol. and Geog. Surv., VI, 265.

Head, thorax and primaries, a rich, somewhat yellowish brown, with the maculation distinct. Collar with a darker brown transverse central line. Basal space inferiorly blackish. T. a. line geminate, dark brown, with a central white line. The line oblique, somewhat convex and slightly sinuate. T. p. line geminate with an outward bend over reniform, below which it is tolerably straight to internal margin. Accompanying the t. p. line is an oblique white shade band not entirely co-incident with the t. p. line. Beyond this line the veins are marked with black scales. At the apex is a paler patch below which the terminal space is irregularly darker brown, and through this the indefinite paler and very irregular s. t. line is traceable; on either side of which are a few irregular black spots, principally beyond the line. Fringes deeper brown. Claviform distinct, narrow ovate, and narrowly ringed with black scales, above which there is a darker, more blackish shade to the ordinary spots. Orbicular small, oval concolorous. Reniform rather large, decidedly oblique, slightly constricted, with a brown central line. A broad black line through cell, interrupted by ordinary spots. Secondaries deep fuscous brown. Beneath reddish with brown powderings and a common outer line. Secondaries paler and with a distinct discal dot.—Expands, 1 inch = 26 mm.

Habitat—Florida.

A single male specimen from Mr. Græf's collection agrees in every particular with Guenée's description, and forms the type of the foregoing. This species I have never seen named in collections. Mr. Grote refers to it in the 6th Vol. of the Bulletin U. S. Geol. and Geogr Surv., p. 265, as follows: "I have identified *exesa* (from Guenée's description and an outline drawing of his) collected by Mr. Schwarz in Florida."

Since that time I have not seen it referred to, nor do I recollect ever seeing it unnamed in collections.

The genitalia are distinctive and more simple than in its allies. The harpes are as usual, long and narrow. The clasper consists of a single, stout and moderately long corneous hook very slightly tapering to the rounded tip.

O. fuscimacula Grt., Bull. U. S. Geol. and Geog. Surv., VI, 262, *Hadena*, ibid., 265, § *Oligia*.

Head, thorax and primaries brown, with a more or less evident, smooth, bluish gray or olivaceous shading. On the primaries the median and terminal space are most evidently brown, the grayish shading usually suffusing the remainder of the wing. Basal half line distinct in most specimens, brown, geminate. T. a. line geminate, included space slightly paler, preceding line faint, often obsolete, following line distinct, narrow, dark; its course is outwardly oblique from costa, sometimes quite even, sometimes with a single outward curve, and again regularly bisinuate. The t. p. line is also geminate, the preceding line distinct, dark, narrow, the included space pale, but distinct, the outer line faint, quite usually obsolete. The line makes a large outward bend over reniform but is quite even below. Claviform wanting. Orbicular small, punctiform, blackish. Reniform moderate in size, oblique, somewhat constricted, dusky. A dusky shade extends below from reniform, rather close to t. p. line, to the internal margin. This shade is very variably distinct in the specimens at hand. The outer portion of the wing becomes darker, and through the inner margin of this dusky shading the slightly sinuate s. t. line is visible. A row of terminal black dots. Fringe concolorous with terminal space. Secondaries smoky fuscous in both sexes. Beneath dull fuscous or smoky, with a common darker outer line.—Expands, .88—1.00 inches = 22—25 mm.

Habitat—Florida.

There seems very little real variation in this species. All the details are subject to small modification which do not however essentially change the characteristic appearance of the insect. I have seen quite a number of specimens in various collections.

The genitalia of the male are distinctive, yet similar in some respects to those of *paginata.*

The harpes are as usual in the genus. The clasper is rather long, slender, abruptly bent near tip, the extreme tip dilated somewhat spoon-shaped, in this respect agreeing with *paginata.* From near the base extends a long slender spur which terminates in a long acute tip, and this is distinctive.

O. grata Hbn., Zutr., p. 16, No. 36, ff. 71—72, *Elaphria* ; Verz. bek. Schmett. 230, *Elaphria* ; Grt., Bull. Buff. Soc. N. Sci., II, 22, *Caradrina.*

rasilis Morr., Pr. Bost. Soc. N. H., 1874, v. 17, p. 158, *Hadena* ; Grt., Can. Ent., VII, 58, pr. syn.; id. 12, 86; Bull. Buff. Soc. N. Sci., II, 211, pr. syn.; Bull. B'klyn Ent. Soc., vol. 3, p. 39, pr. syn.; Bull. U. S. Geol. and Geog. Surv., VI, 265, *Caradrina.*

Head, thorax and primaries evenly brown, with faint gray powderings, the veins marked with blackish scales. Primaris with basal line very indefinite, scarcely traceable, pale. T. a. line narrow, whitish, defined by a few darker scales at each side, evenly oblique outwardly, or slightly curved, rarely somewhat sinuate. T. p. line narrow, white, sinuate, with a slight outward curve over reniform, and a very slight inward curve below. The orbicular is very small, punctiform, consisting of a dusky dot narrowly ringed with whitish. Reniform whitish ringed, narrow, strongly constricted in the middle, the bulbous upper and lower portions dusky. S. t. line slightly paler, indefinite, irregularly but not greatly sinuate. The terminal space a trifle paler than ground color, fringes somewhat darker. Secondaries pale fuscous, whitish in the ♂, with a glistening reddish tinge. Abdomen of the same hue as secondaries. Beneath both wings powdery, with an outer dusky line and a faint discal dot most distinct on secondaries. Primaries darker, secondaries whitish basally.

Expands, .88—1.00 inches = 22—25 mm.

Habitat—Md. and south to Fla., Tex., Mo.

This species is readily distinguished by the red-brown color and even, narrow, pale median lines. The punctiform orbicular, and constricted reniform are also characteristic. The species is not uncommon throughout the southern states.

The genitalia are distinctive. The long narrow, and strongly curved harpes are very much as in the allied species. The clasper, arising from a somewhat irregular corneous base, is long, slender, and somewhat twisted, rectangularly bent toward tip, the spur short and ending in a spatulate tip.

There has been considerable discussion between Messrs. Morrison and Grote, as to which species Hübner's figures really refer. Mr. Morrison contends that they refer to *Tæniocampa oviduca* Gn., and Mr. Grote sees in them the present species. Careful examination of the figure leaves it in doubt, with the probabilities in favor of Mr. Morrison's being right. There is, however, quite as much justice in referring the figure to the present species, and this is done because *oviduca* is everywhere well known under that name while the present species is much less common and well known. As in one or two other instances it is impossible now to be certain what species Hübner had before him, and unless we prefer to carry unidentified names on our catalogue we must make at least an approximate identification.

O. paginata Morr., Pr. Ac. N. Sci., Phil., 1875, v. 27, p. 64, *Hadena*; Grt. Bull. Surv,, 6, 261, *Hadena.*

"Expanse, 24 mm. Length of body 9 mm. Abdomen smooth and untufted. Form slight. Habitus and markings of *H. rasilis* Morr., and *H. chalcedonia* Hübn.

Ground color of anterior wings uniform gray, the markings very simple; the median lines are black and simple, the exterior line extends from the inner margin just before the internal angle, obliquely across the wings, turning out, and forming a rounded projection opposite the reniform spot; the interior line extends obliquely to the usual place of the orbicular spot, it then continues irregularly to the costa; the half line present; the ordinary spots are very small, the orbicular usually obsolete, the reniform whitish; they are connected by a narrow intense black dash, which sometimes encircles the spots, thus uniting together the median lines; the sub-terminal line obsolete. Posterior wings white, usually crossed by a blackish median line.

Beneath, the anterior wings are blackish, the posteriors white, both are crossed by a common median line."

Habitat—Florida.

"This species occurs rather abundantly where it is found; * * *."

The above is from Mr. Morrison's original description. The only specimen I have seen is a ♂ from Mr. Tepper's collection marked type by Mr. Morrison. It agrees in every respect with the description save that the markings are hardly as distinct as described. The wings are somewhat twisted so that it was considered preferable to give the original description rather than risk a new one from this specimen.

The even dull dark gray color, the even, single, black median lines and want of an s. t. line will readily serve to identify the species. It is passing strange that it has not been turned up again so far as I can find, in recent collections. The genitalia of the specimen were fortunately exposed. The harpes are as usual, long and narrow, ending in a somewhat acute tip. The clasper is a broad corneous plate at base, the superior angle produced into a short acute point, the inferior portion produced into a flat strongly curved process which divides at tip, one process being acute, the other rounded. It resembles none of the other species in this respect.

Since the above was written I have seen a fine specimen of this species fully bearing out Mr. Morrison's description but adding nothing new to what I have said above.

The Home of Seirarctia Echo.

By Annie Trumbull Slosson.

In the Spring of 1888 I was so fortunate as to capture at Punta Gorda, Charlotte Harbor, Florida, two specimens of *Seirarctia echo* A. & S. I had known the moth previously only by the meagre description and accompanying plate in Insects of Georgia; and few of the entomologists to whom I showed my specimens had ever seen the species. Mr. Henry Edwards thought the fact of this capture worthy of a note in Ent. Amer., and I was very proud of my treasures.

In February of the present year I was again in Florida, at Ormond, on the Halifax River. The hotel is situated on a strip of land, from a half to three-quarters of a mile in width, between river and ocean, called locally "the peninsula." A few evenings after my arrival there I took upon a lighted window a fine specimen of *S. echo*. The next night another flew into the reading room. Soon afterward in a walk through the woods I found two or three others, apparently just emerged. In the midst of my excitement over these captures I met an intelligent resident of the town, and spoke of what I had found, their interest and rarity. The lady looked surprised and exclaimed: "Why, you surely cannot mean our common moth that comes from the army worm!" I had, previous to this, heard much of a very destructive caterpillar of the peninsula, which travelled in vast armies, devouring all in its path. And now I was to learn that this dreaded pest was the larva of the beautiful moth, so rare in collections, Abbott and Smith's *echo*. I talked with many of the Ormond people on this subject, and collected many facts. These larvæ overrun the whole peninsula and do great damage to garden plants. They are an annual pest, but in certain years are greatly increased in numbers. All my informants agree upon one point, that these larvæ invariably travel towards the north, and are never seen heading towards any other point of the compass. So well is this understood that, in protecting their gardens from the ravages of these caterpillars the inhabitants dig trenches on the south, east and west sides of the ground, leaving the north side open; and none ever enter from that direction. A lady writes: "My father built a sand-wall about a foot high around the south and east sides of our place, with the perpendicular side out, and it kept them out for a good while, until they undermined it by constant crawling up and down in an endless procession, determined to get by. He had no wall on the north side, but not a worm came in." She also writes, "They eat everything, almost,—except orange trees—but their favorite food is anything growing from a bulb, like Coontie, and lilies of all kinds. Mamma lost all her longifolium lilies in one night, and they ate her Sago Palm clear down into the ground, fairly hollowed out the bulb." I was told that the eggs were generally laid upon Coontie, (*Zamia integrifolia*, one of the *Cycadaceæ*), often called Sago Palm; but I never once found them upon this plant. Nearly all I saw, and they were very many, were on the Dwarf palmetto. They were laid in patches of from one hundred and fifty to two hundred eggs, arranged in regular and symmetrical rows, very close together. They were nearly globular in form, though flattened at base, cream white or palest yellow in color, passing day by day into amber, orange and red, and becoming at last dark lead color, almost black before hatching. This took place on the tenth day. The young larvæ fed freely on lettuce, eating enormously. Once, having exhausted their food supply they devoured a large piece of the muslin which covered their jar, and this not to make an aperture through which they might escape, but for food, as not one ran away. On another occasion when the larder was low, some of them made a raid upon some specimens on my drying boards, and ate the wings of several small moths. When shaken from their perch they always spun a thread by which to hang. Being quite inexperienced in the examination and description of larvæ I made but few notes, and these are quite incomplete. I was also travelling from place to place during the growth of the caterpillars, and lost many of them in transportation.

But I sent some eggs, on the day they were laid, to Prof. Packard. These reached him safely on the eve of his departure for Europe, and he placed them in the hands of Mr. Joseph Bridgham for delineation. Mr. Bridgham writes me that he has drawn them, much enlarged, in all stages, so that their history will be beautifully preserved. I also gave two full-grown larvæ, of the five I brought home, to Mr. Henry Edwards, who described them fully and technically, as I was unable to do. The larvæ, when first hatched, were very pale yellow, head shining black, dorsal shield very prominent, black and shining, each segment bore a transverse row of tubercles from each of which sprang a single long hair, those on the back being black, those on sides white. Mr. Bridgham writes: "The tubercles did not change in position during any moulting, but changed much in regard to size. The long hairs, at first single and double from the various tubercles, soon gave place to shorter and more numerous ones. The dorsal shield on first segment diminished in size at each change and the color of head and face also changed. I have mounted a few of the hairs for examination under the microscope, as they seem barbed peculiarly.

The following is Mr. Edwards' description of adult larva.

Larva of **Seirarctia Echo** Abb. & Sm.

Head narrower than the 2nd segment, the two lobes very globose, and glossy; color bright chestnut, almost a dull orange; mouth parts sordid white. Body deep velvety black upon the dorsal and subdorsal regions, chestnut color laterally. Across the segments are two very distinct transverse maculate bands of pale yellow, the posterior band becoming less distinct after the 7th segment until it is only a series of spots. The bands do not extend beyond the subdorsal region. On the anterior edge of each segment is a row of large chestnut colored tubercles, bearing strong spines, chestnut at their extreme base, black otherwise. Whole of the underside, as well as the anal clasps, legs and thoracic feet bright chestnut, the latter tipped with black. Length, full grown, 52 mm.

The arrangement and size of the tubercles, the comparatively small head, and the rows of strong, almost bristly spines, indicate the close relation of this genus to *Ecpantheria*, and it should undoubtedly hold its place in the series near *Ecpantheria* and *Arachnis*.

Neither of my three remaining caterpillars pupated. They spun flimsy cocoons, fastening pieces of lettuce-leaf together by silken threads, but died before transformation. Mr. Edwards was more fortnnate. He wrote: "The one larva has spun up, the other will do so in a day or two. The web is formed of a lettuce-leaf, fastened to the top by a very few fine silk threads, and, after spinning, the larva ate a small piece of the leaf. The change to pupa took place three days after the web was formed. The pupa at first was pale tawny yellow, changing on fourth day to bright chestnut." Later he writes: "One moth emerged in the night of 26th (May), so that it had been 21 days in pupa state." I also received from Florida specimens of second brood, about third week in May.

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Notes on the Catalogue of Phycitidæ and Galleriidæ of N. America by Mr. Ragonot (Ento. Am., Vol. V, p. 113).

By Geo. D. Hulst.

The following species of the catalogue do not belong to the fauna of North America:

Phycita arctella Rag., from the Bahamas, *Euzophera sonorella* Rag., from Mexico, and *Epimorius testaceellus* Rag., from Jamaica.

The following species described from Mexico, I have received from our own country, and they are therefore properly in the catalogue: *Euzophera aglæella* Rag. I have received from Utah, and *Homœosoma illuviella* Rag. I have received from Texas.

The following species have not yet been described: *Lipographis subosseella* Hulst, *Nephopteryx gilvibasella* Hulst, and *Ephestia nigrella* Hulst. These with others will probably be described later. The first does not belong to our fauna.

The following species of the catalogue were described with no locality except "N. America." As Mr. Ragonot seems to include the

West Indies and Mexico under that term, it is possible that a few may not belong to our fauna; *Myelois bilineatella* Rag., *M. duplipunctella* Rag., *Ortholepis jugosella* Rag., *Nephopteryx crassifasciella* Rag., *Meroptera uvinella* Rag., *Salebria subfuscella* Rag., *Epischnia ruderella* Rag., *E. granitella* Rag., *E. fulvinigella* Rag., *Diviana eudoreella* Rag., *Sarata nigrifasciella* Rag., *Vitula serratilineella* Rag., *V. basimaculatella* Rag., *Homœosoma anguliferella* Rag., *Aurora longipalpella* Rag., *Mellisoblaptes fuscolimbellus* Rag., *Navasota hebetella* Rag.

The following described without locality except N. America, I have obtained as follows, so they certainly belong to our fauna: *Acrobasis palliolella* Rag. from Canada, *Nephopteryx rubrisparsella* Rag. from Texas, *N. rhypodella* Hulst (*curvatella* Rag.) from Illinois, and *Salebria nubiferella* Rag. from Texas.

The following species described from the United States or British America are not in the catalogue in any way: *Acrobasis nebulella* Riley, *Nephopteryx subcanalis* Walk., *Stantira variegata* Walk., *Sebunta guttulosa* Walk., *Benta expandens* Walk., *Nephopteryx seminivella* Walk., *Cutina albopunctella* Walk., *Subrita ? abrostolella* Walk., *Myelois coniella* Rag., *M. altensis* Wocke, *Calera punctilimbella* Rag. *Acrobasis demotella* Grote, *Sebunta guttulosa* Walk.,—I am told = *Botis illibalis* Hb.

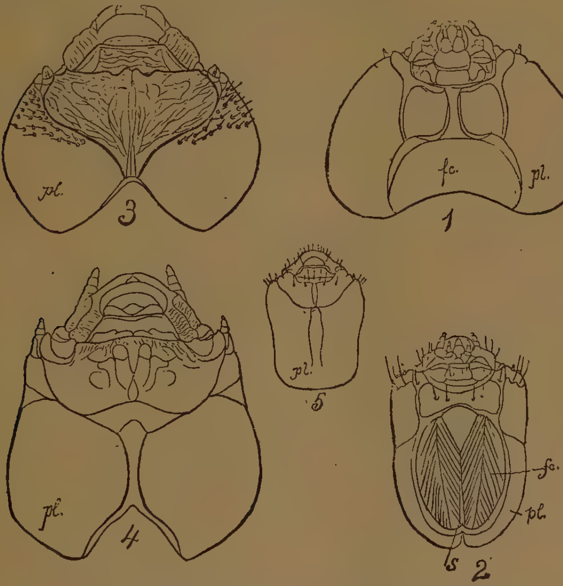
Of the species which Mr. Ragonot has not seen I can with certainty determine the following: *Nephopteryx aurantiacella* Grt. is *Dioryctria miniatella* Rag., *Neph. caliginella* Hulst is *Acrob. comptella* Rag., *Mega. edwardsella* Hulst is *Megasis polyphemella* Rag., *Aner. excantella* Hulst is *Meg. pullatella* Rag., *Neph. perfuscella* Hulst is *Sarata dophneiella* Rag., *Sperm. montinatella* Hulst is *Honora canicostella* Rag., *Neph. carneella* Hulst is *Neph. inquinitella* Rag., *Neph. edmandsii* Pack. is *Vitula dentosella* Rag. In all these cases Mr. Ragonot's names become synonyms. Mr. Ragonot's generic references however are probably correct.

My present intention is to make no criticism upon Mr. Ragonot's references of the species of other authors. I will only remark that on the basis of Prof. Zeller's types in the Cambridge Museum his reference of Prof. Zeller's species is not always correct.

◆

Notes on Cerambycid Larvæ.

The admirable work by the late Prof. J. C. Schiœdte "De metamorphosi Eleutheratorum observationes" published in 11 parts in Krœyer's "Naturhistorisk Tidsskrift" (vol. I—XI, 1862—1880,) contains by far more than disconnected descriptions of Coleopterous larvæ and their illustrations. The work ought to be in the hands of everyone interested in the early history of Coleoptera. The "Conspectus morphologicus" and the "Conspectus systematicus" which Schiœdte prefaced to several large families especially studied by him, form a key to the determination of larvæ; but these keys are by no means always in a convenient form, e. g. in the family *Scarabæidæ*. In the *Cerambycidæ* he gives concise diagnoses of the larval characters of the various sub-families, and Prof. Ganglbauer (Bestimmungstabellen der Europäischen Coleopteren, VII, Cerambycidæ, in Verh. K.-K. Zool.-bot. Ges. Wien, XXXI, p. 681, 1881), has brought these diagnoses into the form of a synoptic table, illustrating the same with copies from some of Schiœdte's figures. Since both the original text of Schiœdte and Ganglbauer's paper are not generally known in this country and certainly have not been used by those who have described North American Cerambycid larvæ, we think we are justified in devoting some space to a translation of the table given by Ganglbauer, the accompanying figures having been copied by Dr. Geo. H. Marx in outline, direct from Schiœdte.



EXPLANATION OF FIGURES.

Fig. 1.—*Asemum striatum* L.; head of larva from beneath (copied from Schiœdte, l. c., pl. XIV, fig. 2).

Fig. 2.—*Saperda carcharias* L.; head of larva from beneath (copied from Schiœdte, l. c., pl. XVIII, fig. 12).

Fig. 3.—*Rhagium mordax* Fabr.; head of larva from above (copied from Schiœdte, l. c., pl. XVII, fig. 1).

Fig. 4.—*Prionus coriareus* L.; head of larva from above (copied with omission of anatomical details from Schiœdte, l.c., pl. 12, fig. 1).

Fig. 5.—*Pogonocherus pilosus* Fabr.; head of larva from above (copied from Schiœdte, l. c.. pl. XII, fig. 14).

pl, pleuræ of head; *fc*, occipital opening; *s*, septum dividing the occipital opening.

SYNOPTIC TABLE OF CERAMBYCID LARVÆ.[*]

Head transverse; longitudinal diameter of occipital opening (foramen cervicale) generally shorter than the transverse diameter; posterior part of head, *i. e.* part invaginated into the prothoracic segment, not divided by a longitudinal wall..... [fig. 1] **CERAMBYCITÆ**

- Pleuræ of head dorsally entirely separated, diverging posteriorly .... [fig. 3] **Lepturini**
- Pleuræ of head dorsally anteriorly connate, posteriorly separated and diverging ....: [fig. 4] **Prionini**
- Pleuræ of head connate throughout, posteriorly separately rounded .... [fig. 1] **Cerambycini**

Head oblong, much longer than wide; longitudinal diameter of occipital opening much longer than the transverse diameter; invaginated portion of head divided into two halves by a longitudinal wall to which the muscles of the mandibles are attached [fig. 2].

- Pleuræ of head dorsally connate throughout, posteriorly conjointly rounded...... [fig. 5] **LAMIITÆ**

The two sub-families in the above table are those proposed by James Thomson in 1864 (Systema Cerambycidarum), and Ganglbauer maintains that this division is justified by the fundamental difference in the structure of the larval head (figs. 1 and 2). The second sub-family, *Lamiitæ* (Thomson's *Metaulacnemitæ*) corresponds exactly with the *Lamiinæ* of our Classification by Leconte and Horn. His division *Prionini* of the first subfamily, *Cerambycitæ* (Thomson's *Analaucnemitæ*), corresponds with the sub-family *Prioninæ* of Leconte and Horn and his two remaining divisions combined correspond with Leconte and Horn's sub-family *Cerambycinæ.* From his synoptic table of the imagos (l. c., p. 684) it is evident that Ganglbauer has great difficulty in separating his *Lepturini* as equivalent to the *Prionini* and *Cerambycini* and Leconte and Horn include them as a "series," *Lepturoides*, in the sub-family *Cerambycini*: but from the larval characters it would appear that the *Lepturini* are not only most readily separated from but also equivalent to the *Prioninæ* and *Cerambycinæ.*

The importance of the above table for the determination of Cerambycid larvæ is evident; all that is necessary to do is to detach the head of the larva, and a glance at the occipital opening and the pleuræ of the head will be sufficient to refer the larva—even without the aid of a lens—to one of the great divisions of the family. J. B. S.

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[*] The above table expressed in the original language used by Schiœdte and compiled from the Conspectus morphologicus and Conspectus systematicus, reads as follows:

Foramen cervicare transverse rotundatum.

- Pleuræ capitis pone epistoma spatio longiole concretæ, post dehiscentes, angulatæ.. Prionini
- Pleuræ capitis pone epistoma ad apicem ferme concretæ, post singulatim rotundatæ.. Cerambycini
- Pleuræ capitis pone epistoma dehiscentes, angulatæ .... Lepturini

Foramen cervicale oblonge ovatum, septo divisum ante decrescente, cui musculi adductores mandibularum affiguntur.

- Pleuræ capitis pone epistoma per totam longitudinem concretæ, post conjunctim rotundatæ.. Lamiini

Count Eugene Keyserling.

By the death of Count Eugene Keyserling of Germany, Natural Science lost one of its prominent and most ardent workers, Arachnology one of its masters.

His loss is not only felt and deeply deplored in his Fatherland, it is on this side of the Atlantic more keenly appreciated than that of any other naturalist of his rank. For the last twenty-five years Count Keyserling has contributed more to the knowledge of that difficult and long neglected chapter, *American Arachnology*, than any other naturalist in this country or in Europe.

Besides his many descriptive pamphlets on that subject Keyserling has left to us two works by which he set for himself a monument on this hemisphere: the Monographs on the *American Laterigradæ* and *Theridiidæ*. He commenced a third monograph on the *Epeiriidæ*, but unfortunately postponed it, taking in hand the continuation of Dr. L. Koch's great work "Die Arachniden Australiens," Dr. Koch himself being compelled to retire on account of impaired eye-sight.

Count Eugene Keyserling, born on the 4th of April 1833, died, exactly 56 years old, on the 4th of April of this year, of tuberculosis of the brain. He was born in Pockroy in the Russian Baltic Province Curland and entered the university of Dorpat, in 1851, to study Natural Sciences. From 1856 to 1858 he visited different parts of the Russian Empire and in 1859 he participated in a Government Expedition to the Kaukasus, Armenia and Persia. In 1860 he went to England and then to Africa; but was, in Algeria, attacked by a fever, which compelled him to return to Europe. In 1864, after having spent some time in France, he intended to visit South America. Previous to his departure however, he visited Switzerland, where he made the acquaintance of a lady, whose attractions caused him to abandon his projected trip to this continent, and he married and settled down as a practical agriculturist, having bought a large estate in Silesia. Here he worked undisturbed and diligently on the Spider fauna of North and South America, receiving specimens from his many friends on this side of the Atlantic.

All American naturalists who had occasion to correspond with Count Keyserling are unanimous in their praise of his amiability, gentleness and liberality, and his untimely departure awoke in many hearts on this continent a deep sorrow and regret at having lost a good friend.

The following is a list of his papers:

1862.—Beschreibung neuer Spinnen aus den Höhlen von Desina (Verhandl. der zool. bot. Gesellsch. Wien).
1863.—Beschreibung neuer Spinnen (Verhandl. der zool. bot. Gesellsch.).
1863.—Beschreibung neuer Arten der Fam. Orbitelæ im Sitzungsber. d. Isis, Dresden.
1865.—Beiträge zur Kenntn. der Orbitelæ, Verhandl. der zool. bot. Gesellsch. Wien.
1876.—Ueber amerik. Spinnen der Citigradæ, " " " " "
1877.—Amerik. Spinnen der Fam. Pholcidæ, Scytodoidæ und Dysderoidæ, Verh. d. zool. bot. Gesellsch. Wien.
1878.—Spinnen aus Uruguay und anderen Gegenden Amerikas, I, II, III. Verh. d. zool. bot. Gesellsch. Wien.
1879.—Spinnen aus Amerika, I. Verhandl. der zool. bot. Gesellsch. Wien.
1880.— " " " II. " " " " "
1880.—Die Spinnen Amerikas—*Laterigradæ.*
1881.—Neue Spinnen aus Amerika, III, Verhandl. der zool. bot. Gesellsch. Wien.
1882.— " " " " IV, " " " " "
1883.— " " " " V, " " " " "
1884.— " " " " VI, " " " " "
1884.—Die Spinnen Amerikas—*Theridiidæ,* I.
1886.— " " " *Theridiidæ,* II.
1887.—Neue Spinnen aus Amerika, VII.

Since 1881 Count Keyserling undertook the continuation of Dr. Koch's "Die Arachniden Australiens."

Washington, D. C., July 1st. GEO. MARX, M. D.

THERE has been considerable objection to the use of shellac for mounting insects, especially duplicates, because of the difficulty of dissolving the shellac if it is desired to re-mount the specimen. Alcohol acts very slowly, and sometimes boiling in alcohol is necessary, especially if the shellac be impure, or the specimen very dirty. Mr. Lugger has suggested a remedy which we have tried and found excellent. Pin the specimens on the underside of the cork of a wide-mouthed bottle containing chloroform, and in a short time the vapor of the chloroform will absorb the shellac, leaving the specimens lying loosely on the cards. We have found shellac much the most satisfactory medium for mounting. We get the ordinary commercial white shellac varnish, put a little of it into a small shallow bottle and let it evaporate to the proper consistency. If it gets too thick, a little alcohol will remedy that. For repairing insects nothing sets so quick or holds so hard.

It does not seem to be generally known that chloroform is by far better than benzine for cleaning greasy specimens, both Coleoptera and Lepidoptera. They can be safely submerged in it without injury. To clean old dirty beetles put them in hot water, let it come to a boil, and with a brush wash carefully—then put into chloroform, and when your specimen is re-mounted it is just as good as new. Only—you cannot use that process more than once. It takes a little judgment in applying, and especially in the boiling, for an overdose would result in a separation of all the parts.

COLLECTING NOTES.

By Charles Liebeck.

About May 5, 1888, while collecting Coleoptera near Westville, N. J., my attention was attracted to a small beetle running actively on the ground, which proved to be a specimen of *Mecynotarsus candidus* Lec. Casting about for more I succeeded in capturing 8 or 10 specimens. This pretty and delicate looking beetle being represented in but one collection in this city, *i. e.* that of Dr. Horn, my small supply soon became exhausted. This season, on the 4th of May, I again visited the same locality and succeeded, after hunting for about two hours, in taking about 40 specimens. It is exceedingly difficult to find these beetles, as they frequent bare, dry spots, where their uniform color exactly matches that of the ground, which probably accounts for its escaping the notice of collectors. The method I have used was to select a bare spot and scoop up about $^1/_2$ inch deep of the loose surface covering and deposit it upon a piece of stiff paper two feet square. After waiting a few minutes, one and sometimes two specimens would suddenly dart across the loose earth and just as suddenly stop, usually among a few grains of sand, where it was simply impossible to distinguish them until they again moved. This insect must be very widely distributed as it occurs from N. J. to Florida and Iowa. On the same day I noticed an unusual carnivorous inclination on the part of a single *Hister biplagiatus*. It victim was a smooth caterpillar, about 1$^1/_4$ inch long, which it had seized on top of the second segment, burying its head beneath the skin after the manner of a tick. For fully 15 minutes I watched them, during which time the unlucky caterpillar's frantic struggles failed to dislodge its assailant, who never once relaxed the grip of its jaws. By this time the caterpillar was covered with the juice oozing from its wound, and having satisfied myself of the intention of the *Hister*, I consigned them both to the alcohol bottle for future reference. My previous knowledge of the habits of this *Hister* has been confined to the droppings around pig-pens, where it may possibly feed upon the numerous larvæ found in such places.

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A NEW remedy for ridding an infested collection of its undesirable guests was given me at the meeting of the Newark Ent. Soc., recently, by one of the members. It is the introduction of a specimen or two of the little *Chelifers*, known as paper scorpions. They will, my informant said, destroy every living thing in the boxes, but will not harm the dried specimens.

Book Notice.

A Preliminary Monograph of the North American species of Trogophlœus; by Capt. Thos. L. Casey. Ann. N. Y. Ac. Sci., v. IV, 1889, pp. 322–383.

In this paper, Capt. Casey seems to have done good work so far as it is possible to judge without actually testing it in collections. The characters used seem clear, the tables are concise, and the descriptions terse—an inprovement perhaps on former papers where excessive length of description was criticised. No sexual characters are used or even mentioned, though in many other Staphylinide genera they are of the highest value. 66 species are recognized, most of them new, and a large proportion of them based on single specimens—a perhaps unavoidable element of weakness, since it is much more difficult to judge of the value of characters. In some respects the most interesting part of the paper, and one meriting thought, is in the introduction, largely devoted to defending the microscope *versus* the hand lens, and somewhat impugning the value of results attained by using the latter. Now here an element comes in which Capt. Casey himself recognizes, when he speaks of "the novice who has not yet learned to interpret what he sees"—it is the experience of the user of either lens or microscope. Behind each is an instrument which is much more important—the trained eye of the observer—the eye that with a good triplet can count the joints of a Trichopterygid antenna, while the untrained user of the compound microscope cannot with an infinitely greater magnifying power be sure any joints exist. Now I am a believer in the microscope, and I use it continually in my work. I have had a binocular stand in use for several years, and have a very fine instrument for my college work—yet it has happened to me frequently that I have taken a specimen from the microscope and studied it with the lens with much more satisfactory results. I saw more and saw it better. Increase in the size of the image does not always import increased distinctness of detail. Discretion in the use of appliances must be exercised and the man who uses a microscope only, is apt to make as many errors as a man using the lens only. It is in the interpretation of what is seen, that the errors are made. It is the experience of the observer, and his ability to select those characters which are of importance, that determines the character of the work: that experience which enables a man to recognize specific characters among the assemblage presented by any given group of insects—which enables him to recognize the limits of variation—which will enable him to discard striking modifications in many instances as unsafe, and rely upon inconspicuous features for specific characters. No hard and fast rules can be formulated for the conscientious student: he will be a "lumper" in one family, a "splitter" in another: he will unite forms considered as distinct, or will separate forms generally regarded as identical: nature does not work in grooves, and it is unsafe to speculate in one group from what is known of another, nor because sculpture in genus *A* furnishes safe characters to treat genus *B* as though it must necessarily furnish the same here.

Capt. Casey advocates more accurate measurements, or statements of the proportion of parts, and suggests a micrometer scheme for that purpose which is very much inferior to some already in use. An adaptation of the ordinary eye piece micrometer will answer every purpose, and just exactly the instrument for the purpose is in constant use by Dr. Marx to obtain accurate proportions in drawing. But with the instrument perfect, I am not at all so sure that accurate measurement will help us much. I feel very certain from my own observation that there is a considerable range of variation in the proportion of parts, and the use of instruments for minute measurement would have the inevitable tendency to a creation of species on characters not sufficiently stable, until experience showed where it could be safely used. Yet nevertheless Capt. Casey's suggestions are good and timely, but it simply needs great caution in using them. Despite the fact that entomologists have been very conservative--perhaps too much so—in adopting more perfect modern means of investigation, our science has not been at a standstill, and we are annually making equal strides with other departments of Zoology in the increase of knowledge.

This is not perhaps all entirely *apropos* of the work on *Trogophlœus*, which seems very good—but it is called forth by that portion of the paper which is equally impertinent to the subject matter of the title. Capt. Casey is a reformer, and like most other reformers apt to overdo matters a little. But on the other hand he will undoubtedly find followers, and even the most conservative will take leaf after leaf of his book until all the good ones are gone—then Capt. Casey will be made responsible for the useless balance, while small credit indeed will be given for the good results caused. I am very much in sympathy with Capt. Casey in his general ideas and methods—but do not always agree with him in his deductions. J. B. S.

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And now comes into court, Mr. Robert H. Lamborn with a proposition to destroy the mosquito, root and branch, by setting the dragon flies on them;—a very good scheme—only impractical unless a species of dragon fly can be produced which will prefer woods and city streets to the open ditches and grassy margins of swamps. We shall have more to say on this subject before long.

Notice of Meeting at Toronto.

The Entomological Club of the A. A. A. S. will meet at 9 A. M., on Wednesday, August 28, in the room of Section F, University Buildings, where members of the Club will register and obtain the Club badge. Members of the Club intending to contribute papers will send titles to the President, Mr. James Fletcher, Government Experimental Farms, Ottawa, Can.

◆

An Association of Economic Entomologists.

The question of forming an Association of economic entomologists, suggested by Prof. Riley, has begun to assume shape. Mr. Fletcher and ye editor have been in communion with Mr. Howard, acting for Prof. Riley, and a scheme has been concocted for submission to the disciples. A call will be circulated within a few days, signed by the gentlemen above named, for a meeting to be held at Toronto, Canada, during the meeting of the A. A. A. S. The exact day and place have not yet been settled, but all of the entomological members of the A. A. A. S. are earnestly urged to attend at Toronto, as matters of considerable importance to entomologists will probably be presented, and a full discussion is desirable.

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Society News.

Brooklyn Entomological Society, June 4, 1889.—Fourteen persons present. Mr. Hulst was elected chairman *pro tem.*, the president and vice-president being absent. Reports were presented by the treasurer, librarian, recording secretary and curators. The president of the society was authorized to present the name of Mr. W. C. Wood of New York City to the council of the Institute for admission to membership therein. Mr. Meeske was appointed a committee of one to arrange joint excursions of the society with other departments of the Institute.

Mr. Weeks read a paper on "Diurnal Carabidæ in the Vicinity of New York," giving a list of the species observed by him as displaying natural activity during the day time with the seasons and circumstances under which they occured and showing habits identical with those of allied European species.

Messrs. Hulst and Smith added to the list. Mr. Meeske suggested that many Carabidæ are involuntarily active during the day by the disturbance of or evaporation of moisture, near their places of concealment.

Each member who could be in attendance at the meeting in September next was requested to prepare and read brief notes upon his experience in collecting during the season in lieu of a stated paper.

A. C. Weeks, *Rec. Sec'y.*

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2.	Explanation of terms, used in Entomology. 38 pp. 1883.	50 Cents.
3.	Synopsis of the N. A. species of Platynus by J. L. Leconte. 16 pp. Nov. 1879	50 Cents.
4.	Synopsis of the Lucanidæ of the U. S. By Chas. Fuchs; with plate. 10 pp.	50 Cents.
5.	Check-List of the N. A. Macrolepidoptera (Diurnals, Sphingidæ, Bombycidæ, Noctuidæ and Geometridæ). 32 pp. 1882.	25 Cents.
6.	Synopsis of the Cicindelidæ of the U.S. of North America by F. G. Schaupp, with five plates (four colored) and woodcuts.	$1.00
7.	"Papilio", vols. I to IV, 1880—1884, each	$2.00
8.	Capt. T. L. Casey's papers as follows:	
	Contributions &c., Part I, 60 pp., 1884,	50 Cents.
	" " Part II, 138 pp., 1885,	$1.00
	Revision of the Stenini of America, north of Mexico. 206 pp. 1 plate, 1884,	$1.50
9.	Check-List of Hemiptera-Heteroptera, by Ph. R. Ubler. 33 pp. 1886.	50 Cts.
10.	Supplement to Henshaw's Check List of Coleoptera. By Samuel Henshaw. 8 pp. 1887.	25 Cts.
11.	"Entomologica Americana", vol. I to IV, each	$2.00

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JOHN B. SMITH,
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ASST. EDITOR:

FRANK H. CHITTENDEN,
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ENTOMOLOGICA AMERICANA

VOL. V. BROOKLYN, SEPTEMBER, 1889. NO. 9.

Review of the North American Species of Pediopsis.

By E. P. Van Duzee, Buffalo, N. Y.

The family *Bythoscopidæ*, to which this genus pertains, is separable from its allies by the position of the ocelli, which are found on the face, more or less remote from its superior margin; the vertex is narrow and confounded with the front, or apparently wanting, the head being entirely deflexed; and the elytra are membranaceous or but slightly thickened. Six northern genera have been established:

- **Idiocerus** Lewis, Trans. Ent. Soc. Lond., I, p. 49, 1834.
- **Macropsis** Lewis, Trans. Ent. Soc. Lond., I, p. 49, 1834.
    - *Oncopsis* Burm., Genera Ins., I, plate 10, 1846.
    - *Stragania* Stål, Rio. Jan. Hemip., II, p. 49, 1861.
- **Pachyopsis** Uhler, Bull. U. S. Geol. and Geog. Surv., III, p. 466, 1877.
- **Bythoscopus** Germ., Silb. Revue, I, 180, 43, 1833.
- **Pediopsis** Burm., Genera Ins., I, plate 10, 1846.
- **Agallia** Curtis, Ent. Mag., I, p. 193, 1833.

Macropsis has not yet been reported from this country; the other genera are well represented here. Mr. Uhler's description of *Pachyopsis* passes without notice several important points, rendering its arrangement in a synoptic table quite impracticable without an example for direct comparison, which unfortunately I do not possess; but its position would seem to be near *Macropsis*. For the determination of the other five genera the synoptic scheme used by Mr. Edwards in his *Synopsis of the British Cicadinæ* will probably be found as convenient as any yet published. To make it more accessible to our American collectors it is copied here: *

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* Since the above was written Mr. Ashmead has published a generic synopsis of the *Bythoscopidæ* practically the same as that of Mr. Edwards except that he includes *Pachyopsis* of Uhler, placing it near *Idiocerus*. See Ent. Am., V, p. 125, July 1889.

1 (6) Antennæ inserted in a deep cavity beneath a ledge.
2 (5) Striation of the pronotum transverse.
3 (4) Side margins of the pronotum sharply keeled, of moderate length........ **Macropsis**
4 (3) Side margins of the pronotum not sharply keeled, very short, ..**Bythoscopus***
5 (2) Striation of the pronotum running obliquely from the middle of its front margin to its hinder angles..**Pediopsis**
6 (1) Antennæ inserted in a feeble cavity, their base free.
7 (8) Head with the eyes wider than the elytra at the base, membrane with an appendix.......... ....**Idiocerus**
8 (7) Head with the eyes as wide as the elytra at the base, no appendix to the membrane...... ....**Agallia**

In some of the genera the marginal nerve of the wing is continued around the apex and joins the first radial near its middle, thus forming an exterior apical cell, called by Fieber the "supernumerary cell." This cell is present in *Macropsis*, *Idiocerus* and *Agallia*, and absent in *Bythoscopus* and *Pediopsis*. Strangely enough, Fieber, in his *Europæische Bythoscopida*, states the presence of this cell in genus *Bythoscopus* in which it does not exist, and its absence in *Agallia* where it is present. The same error is repeated in his *Cicadines d'Europa*. I have examined a number of European species of each of these genera, received from M. Lethierry, and they agree with the American forms in differing from Fieber's positive statement. But Fieber is not the only one who has erred on this point, for as late as 1884 Mayr, in his *Tabellen*, has reversed these two genera exactly as Fieber did before him. If these later papers are not mere compilations from Fieber's synopsis of 1868 these discrepancies are quite inexplicable to me.

Of the genus *Agallia* two species have thus far been described from this country:

Agallia sanguinolenta.

Bythoscopus sanguinolentus Prov. Naturaliste Canadien, vol. IV, p. 376, 1872.

Bythoscopus siccifolius Uhler, Bull. U. S. Geol. and Geog. Surv., vol. II, p. 359, 1876. Wheeler's Rept. of the Chief of Eng. for 1877, p. 1334. Van Duzee, Can. Ent., vol. XXI, p. 9, 1889 (*Agallia*).

Through the kindness of M. Provancher I have had the pleasure of examining a typical example of his species and have thus been able to compare it directly with Mr. Uhler's description, and find that it agrees in every particular. It is not an uncommon species here on grass and weeds in pastures and roadsides, especially where *Carex* and *Juncus* abound.

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* The striation of the pronotum in this genus is not strictly transverse, but toward the anterior margin especially it is quite oblique; thus approaching some forms of *Pediopsis*. Dr. Fitch has described six species under *Athysanus*.

Agallia quadripunctata.

Bythoscopus 4-punctatus Prov. Nat. Can., IV, 376, 1872.

Agallia flaccida Uhl., Van Duzee, Can. Ent., vol. XXI, p. 9, 1889.

This species I have received in exchange from a number of correspondents as *Agallia flaccida* Uhler, and have so used the name myself in exchanging and in the *List of Muskoka Hemiptera*. It seems to have been an early manuscript name of Mr. Uhler. I append a translation of M. Provancher's description, as the periodical in which it occurs seems to be rare and difficult to obtain. For the copy in my possession I am indebted to the kindness of its editor.

"**Bythoscopus 4-punctatus**, 4-pointed *Bythoscopus*, n. sp.

"Length, .12 inch. Of a yellowish brown, more or less obscure. Head varied "with yellow and brown, with two black points on the anterior margin. Prothorax "with two large black points almost on the posterior margin, in line with those of the "head; other less distinct black points sometimes appear in advance of these. "Elytra soiled yellow, the nerves paler. Beneath brown, feet yellowish. Common. "Very near the preceding (*By. sanguinolentus*) but easily distinguished however by "the presence of the two black points on the posterior margin of the prothorax."

This is a very abundant species in Western New York from early in May until September, and in fact the year round, as it appears to hybernate in the adult state as do many if not all the *Jassidæ*.

GENUS **PEDIOPSIS** Burm.

Head entirely or almost entirely deflexed, viewed from above forming a narrow margin to the front of the prothorax; vertex confounded with the front, with the eyes, as wide as the pronotum. Ocelli on the face about opposite the middle of the eyes, from which they are less distant than from each other. A more or less obvious depression crosses the middle of the face a little above the ocelli. Front bounded by a slight depression, not quite reaching the line of the ocelli. A sharp oblique ridge from the outer angle of the eye to near the base of the clypeus, shielding the base of the antenna. Loræ prominent, tumid. Outer cheeks narrow below, where they are largely covered by the loræ. Clypeus oblong or ovate, usually with a lateral depression before the loræ that sometimes extends across the apex. Rostrum short, scarcely attaining the base of the intermediate femora; composed of three joints, the basal hidden beneath the clypeus. Pronotum short and broad, triangular before, sides very short, latero-posterior angles rounded; posterior margin broadly, sometimes angularly, concave. Scutellum broad-triangular, transversely depressed before the apex, which is sub-acute; slightly calloused within the basal angles. Elytra thin or membranaceous, costa more or less arquated, apex rounded, inner margin straight; membrane without an appendix. Ordinarily there are six closed cells on the corium, one basal, two discal, and three ante-apical. Membrane composed of the five apical areoles. One or more additional nerves sometimes appear on the disk of the corium. Clavus with two simple parallel nerves terminating on the sutural margin. Wings very delicate membranaceous; abdominal area large; costa slightly concave; supernumerary cell wanting; first radial simple; second radial forked before the apex, each of these forks is connected by a delicate transverse nerve to the adjacent radial, forming three apical areoles; the two remaining radials simple; a marginal nerve running near and parallel to the outer edge of the wing connects all these radials and their branches. Tarsi three-jointed, the basal joint of the hind pair almost as long as the second and third united. Abdomen short, laterally compressed, showing seven segments above and six beneath; ventral segments after the first much depressed within the connexivum; fifth, or ventral plate, in the male sub-cylindric, slightly emarginate at the apex; in the female flat, obtusely triangular and distinctly emarginate at the apex. The form of this ventral plate in the female, which in *Bythoscopus* differs in the various species and forms excellent specific characters, in *Pediopsis* is scarcely variable and is of little help in discriminating the species. The characters of the genitalia do not differ materially from those of the family; in the male the valve is wanting, the plates are broad and hooked above, the styles are ligulate, curved upward toward the apex, and fringed within with long hairs.

The striation of the pronotum radiates from a central smooth line obliquely towards the posterior angles. In some species these rugæ are very prominent, in others feeble and broken up into coalescing punctures; the same form of sculpture is found on the upper part of the face, but here it is less distinct; the central smooth line is generally discernable as far as the frontal suture. In the male the clypeus and loræ are widened and somewhat swollen, obscuring the sutures and giving a square appearance to the lower part of the face. Two styles of elytral marking may be noted: unicolorous or obscurely clouded elytra, *viridis*, *basalis* and *punctifrons*; transversely banded or maculated elytra, *trimaculata*, *bifasciata*, *flavescens*, *insignis* and *ferrugineoides*; the latter form does not seem to be represented in Europe, or but feebly in *cerea* etc. *P. viridis* as here defined seems to combine the characters of the European group represented by *virescens*, and that represented by *cerea*, *glandacea*, &c., the former by the ♀ *viridis*, the latter by the ♂; the European *cerea*, &c., exhibit a black dot on the propleura and on the outside of the posterior tibia at their base, the former only of which is present in the American species. *P. punctifrons* is the only American representative known to me of the spotted-faced series that is so largely represented in England and on the Continent, but it is not unlikely that other examples will yet be added from the Pacific Coast region where the faunal peculiarities resemble those of Europe much more closely than the Atlantic region. As a rule our species are a little larger than the corresponding European forms, and the pronotal striation is less distinct.

I am placed under renewed obligations to Mr. P. R. Uhler for the loan of very valuable material in this genus and in *Bythoscopus* without which the present studies would have been much more imperfect.

The following synoptic key to our described species I have prepared simply as an aid to determination. It is purely artificial and does not pretend to exhibit to any extent the natural relationship existing between the species. The value of the black dot on the propleura as a specific or even a sexual character is perhaps somewhat questionable, but as it is practically uniform in all the species before me, and a convenient character, I have ventured to make use of it, trusting to future observations to prove or disprove its utility.

SYNOPTIC TABLE.

1 (16) Face unspotted.
2 (7) Elytra hyaline or more or less obscured, not transversely banded or maculated toward the apex.
3 (6) Propleura without a black spot.
4 (5) Entire insect green; elytra hyaline, nerves green..............1. **viridis** ♀
5 (4) Ferruginous; elytra hyaline or nearly so, with a piceous band on the base of the clavus..2. **basalis**
6 (9) Propleura with a black spot. Color dull green or brown, elytra smoky, at least on the apex and inner margin.........................1. **viridis** ♂
7 (2) Elytra colored, more or less distinctly banded or spotted with hyaline, at least toward the apex.
8 (15) Propleura with a black spot.
9 (10) Ferruginous; clypeus short and broad, loræ inconspicuous; size large..... 3. **ferrugineoides**
10 (9) Brown or brownish, at least above, or pale yellow; clypeus of medium length or long, loræ conspicuous (except in *trimaculata*).
11 (12) Rugæ very prominent; clypeus long and narrow, ventral plate of ♀ distinctly convex, elytra brown with a pale point on the disk....4. **insignis**
12 (11) Rugæ not very prominent; clypeus broad, impressed beyond the loræ; ventral plate of ♀ flat.
13 (14) Beneath and legs dark brown or black; elytra brown trimaculate with pale.. 5. **trimaculata**
14 (13) Beneath and legs pale; elytra whitish hyaline bifasciate with brown....... 6. **bifasciata**
15 (8) Propleura without a black spot. Yellow, elytra bifasciate with brown...... 7. **flavescens**
16 (1) Face spotted. Insect pale green; elytra hyaline, nerves fuscous or at least tinged with brownish..................................8. **punctifrons**

1. **Pediopsis viridis** Fitch, Homop. of the N. Y. State Cabinet, p. 59, (1851). Walker, List of Homop., IV, p. 1162, (1852), [*Bythoscopus*]. Uhler, Bull. U. S. Geol. and Geog. Surv., III, p. 467, (1876). Van Duzee, Can. Ent., XXI, p. 9, (1889).

Female.—Uniform pea-green or yellowish-green, generally fading to a yellowish color in the dried specimens. Legs and beneath paler. Face finely punctured below, the rugæ above indistinct, frontal sutures conspicuous; clypeus long, extending for half its length beyond the loræ; eyes brown. Rostrum yellowish green, tip black. Pronotal rugæ feeble. Elytra greenish hyaline, rarely very faintly obscured toward the apex; nerves green, pale toward the tip. Wings very delicate whitish hyaline. Claws and an annulus of small teeth at the tip of the posterior tibia black.

Male.—Obscure green or brown; face and scutellum paler; elytra brown, at least on the apex and inner margin. Facial punctures and frontal rugæ rather more distinct than in the female. Scutellum finely and obscurely punctured. Propleura with a black spot. Beneath pale yellowish brown or honey-yellow with the venter fulvous, in brown examples; or yellowish green with the venter pale, in green examples. Tarsi black or more often only tipped with black. Elytra varying from pale green with a smoky cloud on the apex and inner margin to uniform deep smoky brown. Wings faintly embrowned toward their apex or along their entire outer margin; nervules brown, conspicuous. Tergum greenish or ferruginous, more or less invaded with black, or the disk entirely black with the segments narrowly margined with pale.

Length, ♂, 4½—5 mm.; ♀, 5—6 mm.

The individual variation here encountered is considerable and of a very puzzling nature, and I do not feel fully satisfied that I have rightly defined the species here. Among 86 examples (47 ♂♂ and 39 ♀♀), now before me, 43 males agree in being of some shade of green or brown with the elytra more or less smoky, and with a black spot on the propleura; of the females 37 agree in being of a uniform green of some shade with at most but a faint trace of brown at the apex of the elytra, and without a black spot on the propleura. I feel confident that the variation from green to brown in the males, and from yellowish to deep green in the females is not always or entirely dependant on the maturity of the individual. Of the six anomalous examples before me three males correspond very closely with the females in color, while two females mimic the males; this induced me formerly to consider them distinct species, but as the brown males and green females occur together in great numbers on the same willow bush both as young and adult, and with the entire absence of the similarly colored examples of the opposite sex, it seems necessary to unite them although I have not yet found them pairing.

This is by far our most abundant species of *Pediopsis* in Western New York. It lives on Willow and reaches maturity about the 20th of June, continuing abundant until August. I have also taken it at Muskoka Lake. Mr. Uhler records it from Colorado and has sent me an example labeled "Md., June 18th, on Willow," and two small brown males from Nevada.

2. **Pediopsis basalis**, n. sp.

Form of *P. nassata* Germ. Ferruginous; abdomen olive green; elytra pellucid, slightly clouded at base and apex, a dark piceous band on the base bordering the scutellum. Length, 5 mm., ♀.

Head pale below; face finely and obscurely punctured, above with the central smooth line and radiating rugæ almost obsolete; eyes and ocelli black. Pronotum finely wrinkled; central smooth line nearly obsolete; posterior edge broadly, not angularly, concave. Scutellum finely punctured, darker at the basal angles. Elytra thickened and distinctly wrinkled on the base of the clavus, which is marked with a broad piceous band contiguous to the scutellar margin; base of the corium and apex broadly suffused with pale yellowish brown. Abdomen dirty olive green, the edge of the segments paler. Valves yellow, tipped with green. Tip of the tarsi brownish.

Described from a single female specimen, taken near Muskoka Lake, about the first of August, 1888. This large distinctly marked form can not be confounded with any other described species.

3. **Pediopsis ferrugineoides** n. sp.

Form broad and stout. Color ferruginous, lower half of the face and all beneath yellow, apex of the elytra and a transverse band beyond the middle subhyaline; propleura with a black spot. Length, 5½—6 mm., width of pronotum about 2 mm.

Vertex viewed from above very narrow; face broad and short, with coarse, shallow, not very distinct rugæ and punctures; frontal suture almost obsolete; loræ narrow, inconspicuous, quite widely margined by the cheeks; clypeus broad and short, scarcely projecting beyond the loræ, surface broadly impressed before the tip which is rounded, base tumid with a central depression; tip of the rostrum black. Pronotum darker on the disk; an elongated yellow spot behind the eye, more or less distinct, and a trace of the same color at the apex; rugæ distinct but not conspicuous; posterior margin rather deeply concave. Scutellum coarsely punctured with five yellow spots, two placed within the basal angles, two smaller ones on the middle of the lateral margins, and an abbreviated longitudinal line on the middle of the base; apex yellowish. Legs pale yellow. Abdomen bright fulvous, the venter paler. Elytra ferruginous, paler towards the apex; a transverse band near the tip of the clavus and the apex more or less distinctly subhyaline, the included ferruginous band may be reduced to a spot on the apex of the sutural margin by the costal coalescence of the clear bands, veins concolorous. Wings milky transparent, veins white.

Montana. Two examples, both females, received from Mr. Uhler. One, a pale individual, evidently immature, exhibits but traces of the yellow markings on the pronotum and scutellum. This is the largest species of *Pediopsis* that has come under my observation. It is well distinguished from all our other species by its short tumid clypeus and depressed loræ.

4. **Pediopsis insignis** n. sp.

Dull yellowish brown ♀, or blackish brown ♂; covered with a white bloom when fresh; elytra with a small pale spot beyond the middle; pronotal rugæ very distinct. Length, ♂, 4 mm.; ♀, 4½—5 mm.

Female.—Color, yellowish brown; superior tip and sometimes the apex of the face darker; tip of the rostrum and claws black. Face coarsely and evenly punctured, rugæ distinct above, sutures of the front almost obsolete; loræ prominent, tumid, paler than the face; clypeus narrow, convex, sides scarcely depressed beyond the loræ. Ventral plate broad and rather short, disk distinctly convex, apex with a deep notch. All the pleural pecies with a central black spot, that of the mesopleura much the largest. Pronotum pale yellowish brown; a large dusky patch on the disk almost reaching the anterior margin in the middle, with a curved extension on each side along the hind edge nearly to the humeral angles; rugæ very distinct and oblique over the entire surface; posterior margin deeply arquated. Scutellum pale brown, the basal angles and sometimes the apex with a dusky spot. Elytra uniform pale brown, or slightly paler near the apex of the costa; nervures pale, a small pale spot on the base of the two inner ante-apical cells. Abdomen more or less tinged with ferruginous, the posterior margin of the segments narrowly pale; valves sometimes dusky. Wings smoky hyaline, nervures fuscous. Legs concolorous with the abdomen, the tibiæ darker.

Male.—Blackish brown, elytral nervures scarcely paler; black areas much extended, especially on the abdomen which may be entirely black, with the margins of the segments pale; otherwise like the female.

Many examples taken at Lancaster, N. Y., July 9th, 1889, on low bushes of Wild Plum. One ♀, taken at Madison, Kan., by my brother, M. C. Van Duzee, only differs from the eastern examples in the slightly darker color and abbreviated elytra which reach only to the tip of the abdomen. Superficially this resembles the *trimaculata* but differs from it and from all our other species by the form of the clypeus and ventral plate and by the conspicuous striation of the pronotum, approaching in this respect the European species.

5. **Pediopsis trimaculata** Fitch. Homop. N. Y. State Cab., p. 60, 1851.

Dr. Fitch's description of this species is as follows:

"Dull brown; scutel with a black spot at each angle, the posterior one some-"times obsolete; elytra with pellucid white spots, situated, one on the apex, one on "the disk, and a third anteriorly; scutellar region obscure cinereous; face whitish. "Length, .18 inch. No. 785, ♀."

On the 4th of July, 1885, I took at Colden, N. Y., a single female of this species of which the following is a description:

Form short and robust. Color soiled yellowish brown, face and scutel paler. Apex of the clypeus and coxæ, knees, tarsi, penultimate joint of the rostrum before, margin of the mesosternum, and the venter pale yellowish. Facial rugæ distinct; front rather coarsely punctured. Outer cheeks and pleural pecies black. Antennæ and spines of the posterior tibiæ pale. Valves dusky on the sides. Basal angles of the scutel black. Elytra reaching the tip of the abdomen; clavus deep brown; corium pale grayish white, a large patch near the middle scarcely reaching the claval suture, and extending along the costa to the shoulder, and a transverse band before the apex brown. Length, 5½ mm.

The elytra are of an unusually thick, almost coriaceous texture, with the surface more distinctly wrinkled than in our other species; possibly they are variable in length as in *insignis*. This is probably a rare species.

6. **Pediopsis bifasciata** n. sp.

Brownish ferruginous, pale beneath. Elytra whitish hyaline bifasciate with fuscous. Length, 5½ mm.

Face finely and obscurely punctured; clypeus pale yellowish, broadly depressed and smooth at the apex, clothed with scattering minute hairs; loræ conspicuous, almost concealing the lower part of the cheeks; rostrum rather long, tip black; eyes black. Pronotum finely wrinkled, darker on the disk, the posterior margin narrowly pale; lateral margin rather long with a black spot between the eye and the base of the elytra. Angles of the scutellum darker. Beneath pale honey yellow; pleural pecies and femora, except at base, tinged with ferruginous. Propleura with a black spot. Claws and metanotum black. Tergum yellowish brown, darker toward the apex. Elytra whitish hyaline with a transverse fuscous band, displaced on the claval suture, crossing near their middle, and another just before their apex; nervures concolorous. Wings hyaline, nervures pale fuscous.

The amount of fuscous on the elytra is perhaps subject to variation. In the present example the hyaline surface slightly exceeds the fuscous, and the space between the fuscous bands has a clearer whitish aspect. Described from one ♀ taken at Muskoka Lake the last of July 1888.

This species bears a certain resemblance to the *trimaculata* of Fitch, but it is larger and stouter, the lower surface and legs are pale, the sculpturing of the head and thorax is much finer, and the elytra are differently marked.

7. **Pediopsis flavescens** Prov. Naturaliste Canadien, IV, p. 376, 1872.

Pale yellowish or greenish yellow; abdomen fulvous; elytra with two transverse brown bands. Length, 4½ mm., ♀.

Head, pronotum and scutellum pale yellow or greenish yellow, finely punctured. Clypeus broad, not tumid, the submargin depressed before the loræ, the apex broadly rounded. Eyes brown. Posterior margin of the pronotum rather deeply concave, the rugæ indistinct. Elytra whitish hyaline, obscurely washed with yellowish at the base, with two broad pale brown transverse bands, one near the middle, the other on the apex but omitting the extreme tip. Abdomen fulvous, edges of the dorsal segments, inner margin of the valves, and ventral plate sometimes whitish. Legs pale whitish yellow.

Two examples; Muskoka, Ont., July 1888, and Lancaster, N. Y., June 27th 1889. This species most nearly resembles the preceding but they are sufficiently distinct.

It is not without misgivings that I refer this insect to M. Provancher's species. It is larger than he indicates, is not "washed with brown on the thorax," and the elytral bands are more distinct; but this character is, I think, liable to vary, and the two former could be reconciled by assuming that he drew up his description from a male. With our present meagre knowledge of the North American *Bythoscopidæ* an erroneous determination seems preferable to the possible creation of a new synonym. The following translation of M. Provancher's description will afford a ready means of comparison should more promising material be procured later.

"Length, .12 inch. Yellowish; thorax washed with brownish; elytra hyaline, washed with yellowish at the base, carrying near the middle and at the apex ill defined, more or less apparent spots. Vertex narrow, slightly triangular before the same as the front of the prothorax. Elytra longer than the body. Beneath and feet also yellow."

8. **Pediopsis punctifrons** Uhl. MS.

Similar in form to *P. scutellata* but smaller. Pale or yellowish green; face and scutel with black spots; elytra hyaline with brown nervures. Length, 3½—4 mm., width, about 1½ mm.

Male.—Head broad, less angular before than in *viridis*. Face with distinct but shallow punctures and wrinkles, these broken and somewhat obscure on the front; frontal sutures distinct; loræ of medium width, scarcely tumid; clypeus broad, the sides rounded, with a slight depression beyond the loræ. In fully colored examples there are fine black spots on the face; one above near the tip, another on each side directly above the ocellus, and two comma-shaped spots facing each other on the upper part of the front. Ocelli brown. Eyes pale. Tip of the rostrum black. Propleura with a black spot. Legs and all beneath pale green. Pronotum with distinct rugæ; anterior margin quite strongly depressed each side of the center behind the eyes where there is a row of four or five impressed black points, or a black line; disk sometimes suffused with brownish. Scutellum pale with a broad black central longitudinal line, widened toward the apex where it is divided by a slender pale line; in pale examples this line is broken into three small spots arranged in a triangle; each side of this central line and immediately before the transverse depression is a round black point; and within the basal angles are triangular black spots. Elytra hyaline, greenish at the base, the nervures brown; generally there are one or more extra transverse nervures in the anti-apical cells. Wings transparent with brownish veins. Tergum yellowish green.

The female differs from the male in being paler, with the elytral nervures greenish or but slightly embrowned, and in having the black spots much reduced or some of them wanting. The round black points on each side of the vertex and disk of the scutellum are the last to be effected and are probably never entirely absent.

Arizona. Collected by the late Mr. H. K. Morrison. Described from seven examples; four received from Mr. Uhler and three from the Cornell University collection.

◆

A little lot of *Callimorpha contigua* is now feeding on *Rubus* and *Rosa*. To the kindness of Mr. Schœnborn I owe the eggs, taken from several captured females all exactly alike, as I had an opportunity of seeing. I tried the young larva on Plantain and several others of the ordinary *Arctiid* food plants, but they refused everything but a leaf of Black-cap Raspberry which got in by accident. They will eat also Blackberry and Rose, but took nothing else.

CONTRIBUTIONS TOWARD A MONOGRAPH OF THE NOCTUIDÆ OF NORTH AMERICA.

REVISION OF THE SPECIES OF PSEUDANARTA.*

By John B. Smith.

Genus **PSEUDANARTA** Hy. Edw.

Proc. Cal. Ac. Sci., vol. 6, p. 133, 1875.

Plump, rather robust species of small or medium size. Eyes naked with a distinct fringe of hair or "lashed"—less distinct in *singula*, very heavy in *flavidens* and obvious in *flava*. The head is small, closely applied to the thorax but scarcely sunken. Eyes small, prominent, round. Frontal vestiture scaly, divergent, forming superimposed tufts. Palpi distinct, somewhat divergent, moderate in size, the vestiture rather loose. Tongue long and strong. Antennæ simply and finely ciliate in the male, entirely smooth in the female. Thorax quadrate, vestiture coarse, consisting of a mixture of scales and flattened hairs, forming an anterior divided crest, and a distinct posterior tuft. Patagiæ somewhat uplifted and well defined. Collar marked. Legs short and stout, the spurs of middle and hind tibiæ moderate or rather short, else unarmed; rather densely clothed with long and fine hair. Abdomen somewhat exceeding secondaries, conic, with a row of small, truncate dorsal tufts, and in the male a series of small lateral tufts. Wings proportionate; primaries trigonate, in *falcata* the apices somewhat marked, outer margin bulging medially—in the other species the apices rectangular or somewhat more defined, the outer margin even and rounded obliquely; the fringes are very slightly nicked. Secondaries proportionate, the outer margins even. The coloration of the secondaries is peculiar to the genus—they are yellow, with distinct black outer border, mimicing some species of *Anarta*, which indeed they somewhat resemble in habitus.

The genitalia of the two species examined are not particularly alike and will be especially described with the species.

The genus is scarcely a well defined one, and the species were mostly described as *Hadena*. Mr. Edwards based his genus on the habitus and color, and Mr. Grote adopts it as a rather doubtful division of *Hadena*. The distinctly lashed eyes form perhaps the most distinguishing feature of the genus. The yellow secondaries form a very good superficial distinctive charater.

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* For introduction to this series see Ento. Amer., V, p. 105. The figures to this paper will appear in a following number.

The species are readily distinguishable. Two of them are unknown to me but apparently distinct enough from the descriptions.

Falcata Neumœgen, is said to have the primaries somewhat falcate —an obvious distinction, for none of the other species have any approach to this. The generic reference may be inaccurate. It is compared by its describer to *P. flava.*

Aurea Grote, is a very small species, smaller than *flava*, with very dark primaries, the reniform white and contrasting. The secondaries have the black margin to primaries narrow, and have also the costal margin black—a somewhat distinctive feature.

Flava Grote, is also a small species with more brownish primaries with narrow white lines emphasizing the maculation, the median lines variably separated, and with a usually somewhat faint connecting line.

Singula Grote, is decidedly larger and very distinctly marked. The median lines are very distinctly connected by a black dash and there is an oblique, black, sub-apical shade. The t. p. line has a distinct though not prominent outward tooth over reniform.

Flavidens Grote, is still larger and is the largest species of the genus. The median lines are very even, somewhat approximate and with a very faint connecting line, often entirely wanting. A whitish shade accompanies the t. p. line, and there is a very distinct median shade line through the outer portion of median space, which is found in none of the other species.

In tabular form the scheme is as follows:

Primaries with marked apices, sub-falcate .... **falcata**
Primaries with rectangular or rounded apices.
  Size very small; reniform contrasting, white, color dark; secondaries with costal margin black .... **aurea**
  Size small; reniform not contrasting, color more brownish, costal margins of secondaries not black .... **flava**
  Size larger, moderate.
    Median lines well separated; distinctly connected by a black dash on submedian fold. No distinct median shade line .... **singula**
    Median lines more approximate, even; no distinct connecting line; a very distinct median shade line .... **flavidens**

P. falcata Naum. Papilio, 3, 141, 1883.

Antennæ, head, thorax and abdomen light brown, with anal tuft of a lighter shade. Underside of abdomen and legs of the same lighter shade. Primaries very pointed at apex, then considerably bulging out along exterior margin, and rounding off at inner angle. Color of same a light brown. A light transverse line from near apex to inner margin; the space enclosed between the same and exterior margin of a lighter shade, darkening along the latter and showing faintly a marginal line of irregular dots from apex to inner angle. Another faint, oblique line from costa near base to middle ot interior margin, nearly joining there the anterior transverse line. A faint whitish reniform discal ring, having a larger, oblong anterior companion ring. Fringes light brown.

Secondaries and fringes bright yellow, immaculate, with a distinct broad black marginal band from costa to anal angle. Beneath, primaries, bright yellow, slightly dusted with brown grains along costa. A broad black transverse marginal band covering nearly one-third of the wing. Secondaries bright yellow, slightly dusted with brown along costa. The same broad black marginal band as on upper surface. A small black discal spot.

Expanse of wings, 20 mm. Length of body, 8 mm.

Habitat—Ft. Huachuca, Arizona (Morrison). Type, ♂. Coll., B. Neumœgen.

The only representative of its tribe with falcate wings so far known, nearing otherwise in appearance *A. flava.*

The species is autoptically unknown to me, and the above is Mr. Neumœgen's original description. The wing form is so unlike the other species, as to suggest a doubt of the generic reference.

P. aurea Grt. Bull. Surv., 5, 205; Can. Ent., 14, 19, 1882.

"♂ smaller than *H. flava.* Fore wings dark blackish brown, darker from the arcuate single t. a. line over the anterior half of the median space. Reniform pale, whitish, spherical, standing out, the only prominent feature of the dark primaries, repeated beneath, fringes concolorous. The wing is palest about the reniform and over subterminal space. Hind wings orange yellow with broad even black costal terminal border; beneath as above. Body parts blackish. This species is remarkable for the similarity between the upper and lower surfaces of the wings.

Habitat—Southern Texas, Prof. J. A. Lintner."

"Very different from *flava*, by the black costal border of the orange secondaries and the narrower and more even hind border."

The above is Mr. Grote's original description. I have seen nothing to accord with it thus far. It is also recorded from Arizona.

P. flava Grt. Trans. Am. Ent. Soc., 1874, v. 5, p. 91, *Hadena*; Bull. Surv. 4, 178, *Pseudanarta.*

crocea Hy. Edw. Pr. Cal. Ac. Sci., 1875, v. 6, p. 133, *Pseudanarta*; Grt. Bull. Surv., v. 6, p. 265, pr. var.; Can. Ent., 12, 215, 1880, pr. var.

Head, thorax and primaries blackish fuscous. Patagiæ black margined and white tipped. Collar also pale tipped. Primaries with a brown suffusion through median space. Basal half line geminate, distinct. A short black dash at base and another on internal margin—variably defined and sometimes wanting. T. a. line distinctly geminate, included space bluish white; the line outwardly curved, and angulated, most distinctly in the sub-median interspace. T. p. line geminate outwardly curved over reniform then parallel with outer margin and somewhat sinuate to the internal margin. The inner line distinctly black, included space bluish white. Beyond this line is a bluish white shade extending to the s. t. line, and through the centre of which is a more or less distinct brownish shade most marked on costa. S. t. line pale irregular, more or less marked with blackish preceding spots. A narrow more or less distinct black line through sub-median interspace connects the median lines, which are very variable distances apart. Orbicular concolorous, oblique, narrowly white ringed somewhat varying in shape. Reniform upright elongate, constricted centrally, narrowly white ringed, also variable in shape.

Secondaries yellow, with black borders. Beneath both wings very pale yellow powdered with blackish, with black outer border, and with a small blackish discal spot.

Expands, .80—1.00 inch., 23—25 mm.

Habitat—Or., Br. Col., Col., Nev., Ariz., Texas (?).

A rather variable species, yet readily recognizable.

The reach of variation, and the characters separating *crocea* are thus given by Mr. Grote: "This form only differs from the typical *flava* from British Columbia by the primaries above being shaded with pale, especially on the disc, and being more yellowish, beneath at base, contrasting with the black border. These colorational characters do not seem to be constant, for in one specimen from Oregon the pale shading is confined to a space about the reniform, and in a still paler *crocea*, from Colorado the contrast between the yellow base and the black terminal band is not as great as usual. I think *crocea* is a variety of *flava*. In both the exterior line is outwardly bent over the median nervules and followed by a whitish and then a brown shade."

From the material at my command I would refer *crocea* as a synonym rather than a variety of *flava*. There is no possible line between the two, geographical or otherwise.

P. singula Grt. Can. Ent., 12, 215, 1880, *Pseudanarta*.

Head, thorax and primaries blackish fuscous, varying to dark gray. Thorax with the patagiæ black edged. Primaries with the maculation distinct. Basal half line variably distinct, but always visible, geminate, arquate. A black longitudinal dash, somewhat varying in length—a black mark along inner margin, also somewhat variable in extent. T. a. line geminate, inner line usually faint, the outer black; outwardly curved and bent, and with a longer outward angle on the internal vein. T. p. line bent over reniform and well removed from it, decidedly angulate opposite the inferior portion, thence with a slight inward curve and somewhat tremulous to hind margin. The line is geminate, the inner portion black and sharply defined, the outer more or less obsolete. Beyond the t. p. line a paler shade prevails, gradually darkening to the outer margin. S. t. line paler, faint, irregular. An oblique black shade, consisting of two black diffuse dashes, extends from below apex nearly to t. p. line at its angulation beyond the cell. A broad black mark connects the median lines below the median veins. Orbicular large, oblique, ovate, slightly paler, black ringed. Reniform large, upright slightly constricted medially, somewhat paler, rather indefinitely outlined. Beyond the reniform and close to and parallel with the t. p. line is a narrow black shade line indistinct towards costa, but distinct below reniform to the internal margin. Secondaries yellow, with a broad black outer margin. Beneath primaries very pale yellow, powdered with black and with a broad black margin. Secondaries as above.

Expands, 1.00—1.12 inches, 25—28 mm.

Habitat—Texas, Arizona.

A broader winged and larger species than *flava* and very distinct from it in markings. The large ordinary spots and the oblique black shade below the apex are characteristic.

This is the species recorded by Mr. Morrison as *flava* from Texas, and it is therefore doubtful whether *flava* really occurs there—as *singula* extends to Arizona however, where *flava* is also found, the latter may well be an inhabitant of Texas.

The harpes of the male are very long and narrow, terminating in a somewhat acute tip. The clasper is corneous, long, stout, rather abruptly bent and suddenly narrowing toward tip, terminating in a short beak-like point.

P. flavidens Grt. Bull. Surv., 5, 205, *Pseudanarta*.

Head, thorax and primaries dark ashen or blackish fuscous. Thorax sprinkled with black and gray, the patagiæ black margined. Primaries with median space darker, s. t. space decidedly grayish and paler than the rest of the wing. Basal space somewhat evenly dark gray with a small brown spot near t. a. line. Basal half line geminate, distinct, black. T. a. line very even, curved outwardly, distinctly geminate, the inner line fainter, the outer black. T. p. line geminate, very even, fine, outwardly curved over reniform which the line touches inferiorly, then obliquely incurved to the internal margin. A pale shade beyond reniform through the s. t. space, gradually darkening to the terminal space which is evenly dark, relieving the very irregular pale s. t. line. Orbicular large, oblique, narrowly black ringed grayish powdered. Reniform large upright pale ringed, and with a pale central line. A very distinct black shade line from costa, close to reniform, and between it and orbicular, then parallel with and close to t. p. line to the internal margin. Secondaries orange yellow, with a broad black outer border, costa narrowly black. Beneath, primaries pale yellow, with a broad black outer margin, the disk suffused with blackish. Secondaries as above, the costal region powdered with deep brick red.

Expands, 1.10—1 20 inches, 27.5—30 mm.

Habitat—Colorado.

This species seems rather common locally, and differs from all the other species first in its larger average size, in the very even median lines, the pale s. t. space, and in the distinct black median shade line.

The genitalia of the male have the harpes moderately wide, the tip rounded and slightly oblique. The clasper is corneous, broad at base, suddenly bent beyond its middle, and then moderately long and distinctly curved—differing thus throughout from *singula* without any definite change of type.

◆

Dr. Horn is studying *Heterocerus* and *Ochthebius*.

* * *

Capt. Casey has in hand a Revision of the *Pæderini*.

* * *

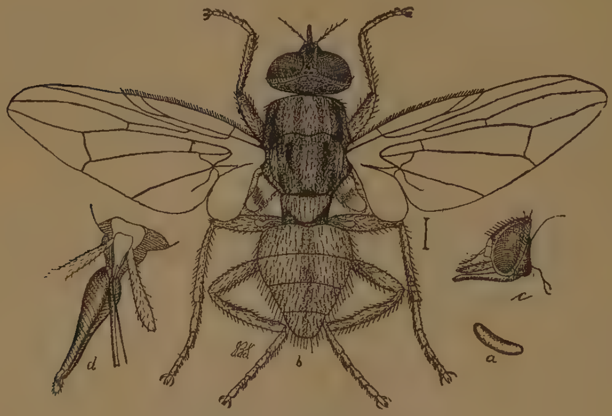
Mr. Roberts is making a very complete collection of water beetles, and promises some results in the *Haliplidæ*.

* * *

"Ye Editor" is getting his Noctuid MS. into shape, and a monograph of *Agrotis* will probably be ready for press early in October.

A New Species of Hæmatobia.

By S. W. Williston, M. D.



HÆMATOBIA CORNICOLA, Will.
a) Egg; b) Imago; c) Head from side; d) Mouth parts.

Hæmatobia cornicola n. sp.

? *H. serrata* Robineau Desvoidy, Myod., 389.—France.

♂. Length, 3½—4 mm. Sides of the front gently concave, in its narrowest width about equal to one-fourth the length of the front from the foremost ocellus to the base of the antennæ; in the middle a narrow, dark brown stripe; a single row of slender bristles on each side. Antennæ brownish red; second joint slightly tumid; third joint a little longer than broad, with its inferior angle rectangular; arista swollen at the base (which is black); the pectinations long. The narrow sides of the front, and the still narrower facial and genial orbits, silvery gray, with a slight yellowish cast; facial foveæ and cheeks blackish, the latter clothed with yellowish hair. Palpi black, the inner surface and immediate base more yellowish; gently spatulate in shape, nearly as long as the proboscis, and extending two-third of their length beyond the oral margin. Mesonotum sub shining black in ground color, but mostly concealed beneath a brownish dust, and with only faint indications of stripes. Dust on the pleuræ more grayish. Abdomen with similar dust; in the middle with a more brownish, sub-interrupted stripe, and narrow dark posterior margins to the segments. Femora black or very deep brown; first two pairs of tibiæ and tarsi brownish yellow or luteous, the hind tibiæ and tarsi blackish brown; hind tibiæ on the posterior surface with noticeable, erect, subapical bristles, hind tarsi about as long as their tibiæ, the first three joints widened from base to tip of each, so as to form a distinct serration on their inner acute angles, each of which terminates in a long hair. Wings with a light blackish tinge (due to microscopic pubescence), the immediate base yellowish; first posterior cell rather symmetrically narrowed to terminate broadly at the extreme tip of the wing.

♀. Front straight on the sides, its width about equal to one-half the distance from the foremost ocellus to the base of the antennæ; the median deep brown stripes about as wide as the lateral pruinose portion. Palpi yellow, with the margins and tip blackish. Legs more yellowish; hind tarsi regular; pulvilli and claws small.

The first specimens of this remarkable fly were sent to me nearly two years ago by Prof. Cope, through Prof. Comstock, and very shortly afterwards by Prof. Riley. More recently I received them from Professors Lintner and Smith. I cannot resist the belief that the species is an introduced one, and suspect that it may be identical with *H. serrata* R. Desv., occuring in France. Aside, however, from the discrepancies that his description shows in the color of the legs, an identification of this author's species is usually, at the best, only a guess. Macquart's very brief description is better, but the palpi are distinctly enlarged, and he says they are not. Nothing but a comparison of the specimens will settle the question. The name *cornicola* was proposed by Prof. Cope.

I separate *Hæmatobia* from *Stomoxys* because I believe the length of the palpi is a sufficient character.

◆

It is never quite safe to say a thing cannot be done, but it strikes the close observer as rather a wild scheme to undertake a study of the relations of the mosquitos and Dragon flies, with a view of breeding the latter to destroy the former. Mr. Lamborn's proposition, made by a circular bearing date July 15th, 1889, offers $200 in three prizes of $150, $30 and $20, for "the three best essays on the destruction of mosquitos and flies by other insects."

The essays must be in by December 1st, 1889. Now here already is an element of impossibility. All who have ever studied any life histories know that one full season of Insect life must elapse before we can speak of a complete history, because number of broods constitutes a very important element in the question mooted by Mr. Lamborn. By the middle of July half the season is over and between July 15th and December 1st it *is* an utter impossibility to make studies resulting in any reliable or practicable suggestions. Yet the "suggestions" made in the circular require study and investigation of the most careful kind which ought to take at least one full year to produce any results at all. We doubt if any entomologist of standing will even contemplate trying for the prize. Then, with all due respect to Dr. Henry McCook, and Dr. J. S. Newberry, they are very far from the best men to choose as judges. It requires entomologists of experience in an economic line to judge of the value of observations and the practicability of methods advocated. Dr. C. V. Riley, Prof. S. A. Forbes, J. A. Lintner, J. H. Comstock or a number of others would have commanded much greater confidence, not because they rank higher as scientists, but because of their special knowledge of raising insects, in studying life habits, and methods of destruction of obnoxious species. We shall look forward with great interest to the result of the studies made to secure the prizes.

NOTES ON THE PÆDERINI.

By Thos. L. Casey.

As preliminary to a revision of our *Pæderini,** it is desired at the present time to publish a few notes and descriptions in the form of a prodromus.

HOMŒOTARSUS Hochh.

At the time of publication of the description of *Hesperobium* (Bull. Cal. Acad. Sci., II, p. 33), the genus *Homœotarsus* was unknown to me in nature, but within the past year I have received from Herr Reitter of Vienna a perfect male specimen of *H. Chaudoiri,* the type of the genus, and find that our species should be generically associated with it, at least for the present. It is true that there are certain differences of minor value, as for instance in the antennæ, which in the Armenian species have the joints strangulated at base, and the eleventh joint fusiform and gradually pointed at apex. The sexual characters are also different, presenting a form of emargination of the fifth and sixth segments, which is quite foreign to our species. These differences are, however, of a secondary or perhaps subgeneric value, and when the genus is thoroughly investigated the species assigned more particularly to *Hesperobium,* will form one only of a number of subgenera; until that time the name can very well be suppressed.

In the remarkable collection recently made by Mr. H. H. Smith in Brazil, there are several very peculiar species; one, for example, in which the large lobe of the third segment in the male is deeply bilobed, giving the appearance of two well developed lobes, and another large slender species, having unusually long and slender legs, in which the posterior trochanters of the male are prolonged in a slender spine which extends to the apex of the femur, reminding us somewhat of the same part in the Carabide genus *Platidius* of Chaudoir.

The following table indicates the differential characters of the eastern species allied to *pallipes* Grav.

Elytra subequal in length to the prothorax.

Posterior margin of the fifth ventral segment ♂ toothed in the middle; emargination of the sixth segment deeper than wide.................... **pallipes**

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* In order that this work may be as complete and useful as possible, it is earnestly hoped that those who have material to spare, may consent to its utilization in the proposed revision. In connection with this request it should be suggested, and I think most collectors will readily agree, that it would be far better for the ultimate welfare of Science if unique types could be retained in the cabinet of the reviser. The contributors would, however, in every case receive in return a larger set of carefully determined species than can probably be included in their individual series.

Posterior margin of the fifth segment simple.
  Emargination of the sixth segment ♂ as wide as deep............**capito**
  Emargination twice as wide as deep..........................**flavicornis**
Elytra much longer than the prothorax ... .**cinctus**

In his original description of *pallipes*, Gravenhorst does not allude in any way to the sexual characters of the male, and his description is perfectly applicable to either *pallipes* or *capito*; the table will therefore serve to establish these species in their mutual relationship. *Cinctus* was, two years after Say's publication, described by Nordmann (Symb. ad Mon. Staph., p. 150), as *Cryptobium latericola*. This was erroneously printed *C. latebricola* by Erichson. and so copied by all the more recent authors, perhaps under the very plausible assumption that *latebricola* is what Nordmann intended to write. *Flavicornis* Lec., is a smaller species with decidedly narrower head; it is rare.

The following new genera are perhaps worthy of description on this occasion:

MEGASTILICUS n. gen.

Body robust, sub-depressed. Head rounded, borne on a very slender neck. Eyes rather small. Antennæ very short, compact, slightly robust, scarcely perceptibly incrassate. Labrum large, broadly emarginate in the middle at apex, the emargination bidentate. Maxillary palpi very small, moderately robust; third joint cylindrical, about twice as long as the second, truncate at apex; fourth joint small, subulate. Legs long and slender; tarsi cylindrical, the anterior not in the least dilated in the male; posterior nearly as long as the tibiæ, with the first four joints decreasing gradually in length, the first shorter than the next two combined and slightly longer than the fifth.

This is a myrmecophilous genus, peculiar in the structure of the maxillary palpi, in this respect having no near allies which I have seen. The body is remarkably robust.

M. formicarius n. sp.

Rufo-ferruginous; head and abdomen piceous; entire upper surface densely granulato-reticulate, rather dull and covered somewhat densely with short erect and very robust spinules; abdomen smoother and not granulate. Head as wide as long, very slightly wider and longer than the prothorax, the latter hexagonal, widest much before the middle, feebly narrowed toward base, the latter transversely truncate. Elytra slightly wider than long, longer than the prothorax and, toward apex, nearly twice as wide. Abdomen short and broad, in the middle slightly wider than the elytra; sides arcuate. Length, 5 mm.

New Jersey; Massachusetts.

The male has the apex of the sixth ventral segment deeply sinuate.

I am indebted for my first specimen of this very singular insect to my friend Mr. W. Jülich, of New York; subsequently I received several others through the kindness of Mr. F. Blanchard, of Lowell, Mass.; whose MS. name I have adopted for the genus.

PLATYMEDON n. gen.

Body robust, depressed, with the sides parallel. Labrum rather short, quadridentate; teeth short. Antennæ moderate in length, slender, not incrassate, the first joint more robust. Eyes moderate. Maxillary palpi rather well developed; third joint very strongly compressed, longer than the second and increasing in width from base to apex; fourth minute, subulate, very strongly compressed. Neck broad. Anterior coxal cavities open behind, the pronotal hypomera widely inflexed behind and acute, becoming rapidly narrower anteriorly. Legs slender, moderate in length; tarsi slender, the posterior elongate, three-fourth as long as the tibiæ, the first four joints decreasing rapidly in length, the first shorter than the next two together and much longer than the fifth.

This is also a myrmecophilous genus, the distinguishing character of which is the very strong compression of the third and fourth joints of the maxillary palpi. It is related to *Medon*.

P. laticollis n. sp.

Rufo-ferruginous throughout; integuments shining, not reticulate, the abdomen subalutaceous and much more densely pubescent; anterior portions very finely and not very densely pubescent. Head wider than long; sides nearly parallel; base broadly, very feebly arcuate; antennæ much shorter than the head and prothorax together. Prothorax as long as the head and slightly wider, one-half wider than long; sides nearly parallel; basal angles broadly rounded. Elytra distinctly wider than long, longer than the prothorax but scarcely perceptibly wider. Abdomen as wide as the elytra, the fifth segment as long as the two preceding together. Length, 4.2 mm.

Nebraska.

The single specimen before me I owe to the kindness of Mr. E. A. Schwarz; it is probably a female.

◆

At the meeting of the Feltman Collecting Social, July 9th, Mr. Laurent gave a description of a very ingenious box for preserving food plants fresh for some time. The size of the box determined on, a rough wooden box, is partly filled with fluid plaster of paris, and another box of the inside dimensions desired is pressed into the pasty mass, the space between the two boxes being then completely filled and the edges made smooth and even. When the plaster has set, the inside box is broken out and the plaster box turned out of the outside casing. For the cover a shallow mold is prepared with a smooth bottom and a flat cover is cast which, if the job is neatly done, will fit tightly upon the plaster box. The plaster will absorb a great deal of water and give it off very slowly, keeping the plants in the box fresh a long time. When dry the box is put under a tap and again charged. Mr. Laurent says he has kept Sassafras fresh for 13 days in such a box. For a man able to get out only once a week, such boxes would prove of immense advantage.

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ENTOMOLOGICA AMERICANA

VOL. V.—BROOKLYN, OCT. & NOV., 1889.—NOS. 10 & 11.

A GENERIC SYNOPSIS OF THE APHIDIDÆ.

By Wm. H. Ashmead.

Family VIII. APHIDIDÆ.

All soft bodied insects. Head small, longer than wide, and seldom as wide as the thorax; the frons most frequently triangular, flattened, slightly concave or slightly convex, never much produced. Eyes prominent, hemispherical, facetted, with a slight tubercle posteriorly, and situated on the sides of the head, entirely absent only in a few subterranean species. Ocelli 3, small, sometimes indistinct or wanting, 2 situated close to the eye and one on the vertex. Beak 3-jointed, arising at the hinder inferior part of the head, enclosing 3 to 4 fine setæ, when at rest usually pressed close to the sternum in a more or less distinct groove between the coxæ. Antennæ filiform, 3- to 7 jointed, of variable length, sometimes longer than the body. Thorax usually well developed and lobed. Scutellum not large transverse or triangular. Wings when present four, membranous, not strongly veined—a costal, subcostal, discoidal and stigmal veins. Tegulæ present but very small. Coxæ short, conical, gradually increasing in size posteriorly, not contiguous. Femora seldom very thick. Tibiæ usually long, slender, cylindrical. Tarsi short, 2-jointed, except in Oestlund's new genus *Mastopoda*, in which they are atrophied, and one-jointed in two or three subterranean genera; the latter, however, are probably nothing but nymphs. Pulvilli usually present. Abdomen oval, elongate oval or ovoid, the sixth segment dorsally often with distinct honey-tubes or nectaries; in some forms these are subobsolete or tuberculate, or visible only as oval openings, in others they are entirely wanting; they secrete a sweet substance called "honey-dew" of which ants are particularly fond.

At the tip of the abdomen is usually found a more or less distinct appendage, seldom entirely wanting, called the cauda or style.

To both the student and philosopher there is no more interesting family to study than the *Aphididæ*, and connected with their life histories are many scientific problems, that yet remain unsolved.

The females of many of the species are viviparous, although some of these are now known to be merely the dimorphic or seasonable variety of an oviparous form, and some of these *probably* change their food-plant and habitat as often as there are seasons in the year.

The eggs of most of the *Aphididæ* are long oval, but in some of the lower forms they are more or less spherical. Many of the species live in galls, others cover themselves with a wooly or flocculent secretion, while a few secrete a waxy covering for themselves analogous to that produced by the *Coccids*.

The family may be divided into seven subfamilies, recognized by the aid of the following table:

TABLE OF THE SUBFAMILIES.

A– Honey tubes always distinct, often quite long.
  Front wings with a double forked cubitus; hind wings with two oblique veins; antennæ 7-jointed........................Subfamily I. **APHIDINÆ**
B—Honey tubes very short, tuberculiform or subobsolete.
  Front wings with a double forked cubitus (except in *Amycla* Koch); hind wings with two oblique veins.
    Antennæ 7-jointed, the 7th joint setaceous, not rudimentary..... .... Subfamily II. **CALLIPTERINÆ**
    Antennæ 6-jointed, usually with a spur or rudimentary 7th joint........... Subfamily III. **LACHNINÆ**
C—No honey tubes.
  Front wings with cubitus once forked; hind wings with one or two oblique veins.
    Antennæ 5- or 6-jointed...........Subfamily IV. **SCHIZONEURINÆ**
  Front wings with cubitus not forked; hind wings with one or two oblique veins.
    Antennæ 5- or 6-jointed......... .....Subfamily V. **PEMPHIGINÆ**
  Front wings with only three veins.
    Antennæ 5-jointed; hind wing with a subcostal nerve and an oblique vein.. Subfamily VI. **CHERMESINÆ**
    Antennæ 3-jointed; hind wing with a subcostal nerve and no oblique vein... Subfamily VII. **PHYLLOXERINÆ**

Subfamily I. **APHIDINÆ.**

TABLE OF GENERA.

1 Antennæ not on frontal tubercles..4
  Antennæ on frontal tubercles.
    Antennæ not approximate at base; frons not grooved, flat or convex.........2
    Antennæ approximate at base; frons grooved......G. 1. **Siphonophora Koch**
2 First antennal joint with a tooth on the inside ....G. 2. **Phorodon Pass.**
  First antennal joint without a tooth on the inside.

Prothorax with lateral tubercles.
  Honey tubes long, much dilated in the middle. .G. 3. **Macrosiphum** Oestl.
Prothorax without lateral tubercles.
  Honey tubes not distinctly clavate or expanded at apex..................3
  Honey tubes distinctly clavate..............G. 4. **Rhopalosiphum** Koch
  Honey tubes expanded at apex or trumpet mouthed..................
G. 5. **Megoura** Buckt.

3 Cubital vein once forked................ ....G. 6. **Toxoptera** Koch
Cubital vein twice forked.
  Honey tubes moderately long ; style much shorter than honey tubes. ....
G. 7. **Myzus** Pass.
  Honey tubes short ; style as long or longer than honey tubes. ....
G. 8. **Hyalopterus** Koch
  Honey tubes curved and usually enlarged in the middle ; style very small or wanting .... G. 9. **Drepanosiphum** Koch

4 Seventh antennal joint as long or longer than the sixth.
  Antennæ not pilose.
    Honey tubes longer than thick, cylindrical .... G. 10. **Aphis** Linn.
    Honey tubes clavate........................G. 11. **Siphocoryne** Pass.

SUBFAMILY II. CALLIPTERINÆ.

TABLE OF GENERA.

1 Seventh antennal joint shorter than the sixth........ 3
Seventh antennal joint as long or longer than the sixth.
  Antennæ not pilose ; 7th joint longer than 6th, honey-tubes subobsolete ; cauda very small...............................G. 1. **Cryptosiphum** Buckt.
  Antennæ pilose.
    Abdomen bare, not hairy or tuberculate..............................2
    Abdomen hairy or tuberculate.
      Rostrum short...........................G. 2. **Chaitophorus** Koch
      Rostrum long.
        Honey tubes pear-shaped ; prothorax with lateral teeth................
G. 3. **Melanoxanthus** Buckt.
        Honey tubes short, cylindrical ; prothorax without lateral teeth.
G. 4. **Pterocomma** Buckt.

2 Rostrum extending at least to the hind coxæ ....G. 5. **Pterocallis** Pass.
Rostrum very short, stout, not extending beyond the anterior coxæ . . ...
G. 6. **Ptychodes** Buckt.
  Antennæ not pilose............................. G. 7. **Myzocallis** Pass.

3 Wings horizontal ; rostrum very short ; style enlarged at the apex ... ...
G. 8. **Monellia** Oestl.
Wings deflexed ; rostrum short, seldom reaching to middle coxæ, style short, globular .... G. 9. **Callipterus** Koch

SUBFAMILY III. LACHNINÆ.

TABLE OF GENERA.

1 Winged forms unknown..... 4
Winged forms known.
  Abdomen woolly.. 3
  Abdomen not woolly.

Sixth antennal joint filiform or clavate ending in a spur 2

Sixth antennal joint setaceous without a spur at apex.

Tibiæ and tarsi normal .... G. 1. **Sipha** Pass.

Tibiæ truncate at tips; tarsi rudimentary, no claws, in place a short mammiferous tubercle .... G. 2. **Mastopoda** Oestl.

2 Abdomen somewhat hairy; stigmal vein straight or but slightly recurved.

Rostrum very short; honey tubes twice as long as thick; antennæ hairy, 4th, 5th and 6th joints nearly equal .... G. 3. **Cladobius** Koch

Rostrum not reaching beyond middle of abdomen.

Hind legs lengthened .... G. 4. **Lachnus** Illiger

Hind legs abnormally lengthened .... G. 5. **Dryobius** Koch

Rostrum reaching beyond apex of abdomen........ G. 6. **Stomaphis** Walk.

Abdomen not hairy; honey tubes inconspicuous; third discoidal vein simple, not forked .... G. 7. **Amycla** Koch

3 Rostrum very short.

Third antennal joint about twice the length of fourth . G. 8. **Phyllaphis** Koch

Third antennal joint as long as the two following; cubitus not forked .... G. 9. **Prociphilus** Koch

4 Antennæ not pilose; body long and narrow; legs very short.................. G. 10. **Brachycolus** Buckt.

Antennæ pilose.

Eyes moderate; third antennal joint not longer than the fourth; hind tarsi 2-jointed.................................... G. 11. **Paracletus** Heydn

Eyes subobsolete; third antennal joint longer than the fourth; hind tarsi one-jointed .... G. 12. **Trama** Heyd.

SUBFAMILY IV. SCHIZONEURINÆ.

TABLE OF GENERA.

1 Antennæ 5-jointed 2

Antennæ 6-jointed.

Hind wings with two oblique veins.

Stigma abnormally lengthened.................... G. 1. **Mindarus** Koch*

Stigma normal.................................. G. 2. **Schizoneura** Hartig

Hind wings with 1 oblique vein .... G. 3. **Glyphina** Koch
(= *Colopha* Monell)

2 Hind wings with 1 oblique vein.......................... G. 4. **Vacuna** Heyd.
(? = *Hormaphis* O. S.)

SUBFAMILY V. PEMPHIGINÆ.

TABLE OF GENERA.

1 Wingless forms; the tarsi with but a single claw 3

Winged.

Hind wings with one oblique vein 2

Hind wings with two oblique veins.

Stigma of front wings normal; antennæ short.... G. 1. **Pemphigus** Hartig
(= *Thecabius* Koch)

Stigma of front wings abnormal, extending to the apex; antennæ long....... G. 2. **Stagona** Koch

---

* This genus may belong to the *Lachninæ* and seems to form the connecting link between the *Lachninæ* and *Schizoneurinæ*.

2 Wings deflexed in repose............................G. 3. **Tetraneura** Hartig
Wings horizontal in repose...........................G. 4. **Aploneura** Pass.
3 Antennæ 6-jointed.
Third antennal joint longer than fourth..................G. 5. **Forda** Heyd.
Third antennal joint equal with the fourth.............G. 6. **Rhizobius** Burm.
Fourth joint as long as the first three.................G. 7. **Eudeis** Koch
Antennæ 5-jointed..G. 8. **Tychea** Koch

SUBFAMILY VI. CHERMESINÆ.

TABLE OF GENERA.

Front wings with 3 oblique veins.
Head with frontal horns; third joint the longest; apterous ♀ surrounded with disks of wax..G. 1. **Cerataphis** Licht.
Head without frontal horns.
Stigma normal..G. 2. **Chermes** Linn.
Stigma abnormal......................................G. 3. **Adelges** Vallot
First oblique vein with a branch issuing from near its base and which is once forked, the upper branch of which extends almost parallel with the stigma before bending obliquely towards the apical margin.............G. 4. **Anisophleba** Koch

SUBFAMILY VII. PHYLLOXERINÆ.

Antennæ 3-jointed..G. 1. **Phylloxera** Fousc.

Description of the Larva of Sphinx luscitiosa, *Clemens.*

BY HARRISON G. DYAR.

Head, shagreened, of a grass green color with two paler green stripes edged posteriorly with a darker shade. Tips of jaws and eyes black. Body, pale green, slightly darker on the posterior segments. On joints 3 and 4 are sparsely distributed white dots, each surrounded by a fine black ring. These spots are also found on the venter and subventral space for the entire length, but diminish in number on the posterior segments. Seven oblique lateral lines on joints 7 to 12, the last one extending from the base of joint 11 over joint 12 to the caudal horn. These stripes are white, shaded anteriorly with dull crimson in which is situated near the edge a very fine black line. Caudal horn green, with a black stripe on each side, this being the continuation of the posterior oblique lateral line. Thoracic feet pale yellowish, tipped with pinkish. Spiracles, reddish. The length of the mature larva is about 60 mm.

The food plant is said to be Willow, which I believe to be correct. The larva from which the present description was drawn was found, fully grown, in a little stream over which bushes of Willow extended. It was nearly drowned and had barely strength enough to revive.

Sphinx luscitiosa is single brooded.

Pupation occurring in July.

Larva from Ulster County, N. Y.

Descriptions of New Species of Mexican Heterocera.

By Wm. Schaus, Jr.

Subfamily CTENUCHINÆ.

Idalus herois n. sp.

Primaries deep yellow, crossed from about the middle of the costal margin to near the internal angle by a black band which is widest at either extremity, and on the outer costal portion the black extends along the margin to the apex; this transverse band is divided into a series of spots by the veins which are gray-white wherever they cross the band; it is also broadly bordered on its entire inner portion, and at either extremity of its outer portion with white. At the base of the primaries is a similarly marked transverse band, and also a few pink scales at the base of the inner margin. Fringes white. Secondaries white, having in the male the outer two-thirds of the wings powdered with pink scales, but in the female only the inner margin is so marked. Underneath whitish with the outer two-thirds of the costal margin on the primaries and two small spots at the end of the cell dull black. Head and thorax white, spotted with roseate-brown. Abdomen above carmine with a dorsal row of white spots in the female; the anus and underside of the abdomen white.

Expanse, 35—45 mm.

2 ♂♂, 2 ♀♀. Coatepec.

Family ARCTIIDÆ.

Arachnis perotensis n. sp.

Male.—Primaries above white, crossed from the costal to the inner margin by numerous irregular brown-gray bands edged with black. Secondaries white, transparent, with a few large gray spots on the costal margin, and a few very small ones on the outer margin; the inner margin thickly clothed with long red scales. Underside the same as upper, slightly reddish along the costal margins. Body rather woolly. Head gray, frons white. Collar white with two large gray spots circled with black. Thorax gray streaked with black and white. Abdomen dull red above with a brown dorsal band, and a lateral row of small brown spots; underneath white. Legs mottled with gray. Expanse 38 mm.

Female.—Primaries similar to the male. Secondaries dull red with three broken and irregular transverse bands of a dull gray margined with a darker shade of gray. Extreme outer margin also dull gray, and the fringes white or dull gray. The underside the same as the upper. Head and thorax the same as in the male. Abdomen not so woolly as in the other sex; above reddish, except the last three segments which are yellowish, and with a dorsal and a lateral row of dull gray spots; underneath white. Expanse, 45 mm.

1 ♂, 3 ♀♀. Cofre de Perote. Elevation, 10,000 feet. From pupæ found under the bark of a species of Pine.

The female bears a strong resemblance to *Arachnis aulea* Bd.

Arachnis suffusa n. sp.

Male.—Primaries white, crossed from the costal to the inner margin by very irregular and broken bands of dark gray narrowly edged with black. Secondaries creamy white with a few black spots along the costal margin and two very small spots at the anal angle. Underside the same as the upper, with the costal margins and the bases of the wings slightly yellowish. Head white. Collar and thorax white with large gray spots margined with black. Abdomen above bright yellow with a dorsal row of large black spots, and two lateral rows of small black spots. Underneath white. Legs circled with gray and yellow. Expanse, 42 mm.

Female.—Differs in having the transverse bands on the primaries paler and broader. The secondaries are crossed by a basal and two central rows of light gray spots margined with a darker shade of gray, and on the extreme margin below the apex is a row of five similarly colored spots. The abdomen has the dorsal and the lateral spots gray, margined with black. Expanse, 52 mm.

1 ♂, 2 ♀♀. Ex. larva. Rinconada, State of Vera Cruz.

Carales divina n. sp.

Primaries whitish, thickly powdered with drab scales; along the costa three brown blotches extending to the median vein; beyond the cell a wavy brown band crosses the wing from the costal margin to the inner margin; a subterminal wavy brown line, and a terminal series of semi-lunular brown streaks; fringe brown. On the costal margin two short fine dashes of pink and a small pink spot at the base of the wings. Secondaries slightly transparent, gray, with the outer half of the wing rather darker and an indistinct spot at the end of the cell. Underneath the wings are thinly covered with scales, uniform grayish, indistinctly showing the markings of the upper side; at the four apices are a few whitish spots, and at the centre of the costal margins of the primaries a dash of pink. Head, collar, and thorax gray, with two round black spots on the collar. Abdomen above pink with a dorsal and lateral row of black spots; underneath whitish. Thorax underneath pink. Legs gray; fore femora pink. Antennæ gray, pink at the base. Expanse, 55 mm.

1 ♂, 1 ♀, found in copulation on a Pine at an elevation of 10,000 feet on the Cofre de Perote.

Opharus tristis n. sp.

Primaries above uniform dull black, slightly transparent. Secondaries similar but whitish near the base. Underneath the same as above, with the white at the base of the secondaries more conspicuous. Head, thorax and abdomen dull black; on the latter dorsally are two rows of white spots, each placed on the extreme outer portion, and just below laterally on either side are two rows of smaller white spots. Femora streaked with white. Expanse, 50 mm.

1 ♂. Jalapa.

FAMILY LITHOSIIDÆ.

Crambomorpha tolteca n. sp.

Primaries above silvery gray-white, with the inner margin broadly shaded with brown. Secondaries pale yellowish. Underside yellow, with the base of the primaries, and also the outer margins broadly gray; the inner and the costal margins of the secondaries whitish. Head, thorax and abdomen above gray, underneath yellowish. Antennæ ochreous. Expanse, 34 mm.

2 ♂♂, 2 ♀♀. Las Vigas and Coatepec.

Leptidule æetes n. sp.

Primaries ochreous, darkest on the margins and with a darker band crossing the wing from the costal margin near the apex to the middle of the inner margin. Secondaries ochreous, slightly hyaline, darkest around the outer margins. Head, thorax and abdomen ochreous. Antennæ black. Expanse, 21 mm.

1 ♂. Paso de San Juan.

Euphanessa pauper n. sp.

Wings ochreous hyaline. On the primaries at the base of the costal margin is a black point; about the center of the cell is a smoky spot, and below it a second similar spot. Just beyond the cell the wing is crossed by a smoky band, having at its upper extremity two short diverging branches, one extending towards the apex, and the other towards the center of the outer margin, in one instance touching it. Antennæ, head, thorax and abdomen ochreous. Expanse, 24 mm.

2 ♂♂. Las Vigas.

FAMILY MELAMERIDÆ.

Ephialtias coatepeca n. sp.

Primaries and secondaries velvety black; the primaries crossed from the middle of the costal margin to the anal angle by a rich yellow band; the secondaries with a broadish central yellow band. Antennæ, head, thorax and abdomen dull black. Abdomen beneath white. Expanse, 28—31 mm.

2 ♂♂, 5 ♀♀. Coatepec, Paso de San Juan. Closely allied to *Ephialtias ariaca* Druce.

Melanchroia monticola n. sp.

Wings blue black with the apices of the primaries very narrowly white. Underneath the base of each costal margin bright red. Head, thorax and abdomen dull black. Collar reddish. Expanse, 30 mm.

2 ♀♀. Las Vigas. Elevation, 9,000 feet. Allied to *Melanchroia spuria* Hy. Edw.

FAMILY DIOPTIDÆ.

Polypœtes cethegus n. sp.

Primaries above olive brown, paler at the base and along the outer margin; all the veins yellowish-brown; a white spot at the end of the cell. Secondaries white with a very broad abdominal and outer margin, and a narrow costal margin black. Underneath primaries dull black with a white spot at the end of the cell; the secondaries the same as on the upper side. Head, thorax and abdomen dull black above, whitish underneath. Tegulæ ochreous. Expanse, 27 mm.

2 ♂♂, 2 ♀♀. Coatepec. This species is most nearly allied to *Polypœtes etearchus* Druce, but differs from that species in the ground color of the primaries, and also in having the black margin to the secondaries much broader.

FAMILY CERATOCAMPIDÆ.

Eacles ormondei n. sp.

Primaries above orange red, except a small space in the cell, a triangular space at the apex and a small space at the anal angle, all of which are yellow. The wings are speckled as in other species of *Eacles* with purplish brown. A straight purplish line crosses the wing from the apex to the inner margin at two-thirds from the base; this line is bordered outwardly on its anterior half with lilac. The wings are also crossed near their base by a narrow dark wavy band. About the center of the outer margin the ground color assumes a darker shade, and at the end of each vein is a small dark spot. The two discal spots dark gray with a few whitish scales in their center Secondaries yellow, speckled with brown. a purplish wavy transverse band crossing from the costal to the inner margins. An elongated orange red space borders this band on its outer portion. The basal portion of the inner margin and a wavy band at the base of the secondaries also orange red. The discal spot dark gray with a white center. A few dark spots at the tips of the veins along the outer margin. Underneath yellow mottled with lilac and pinkish scales and speckled with brown; a lunular band crosses the wings from the apex of the primaries to the center of the inner margin on the secondaries. Head and collar yellow, thorax orange red; abdomen dorsally orange red, laterally yellow with a row of dark gray spots, and underneath purplish. Expanse, 128 mm.

1 ♀. Coatepec.

Descriptions of New Scydmænidæ and Pselaphidæ.

By E. Brendel.

SCYDMÆNIDÆ.

Brachycepsis n. g. Head twice as wide as long, eyes large, prominent, palpi with the second joint obconical, the last a shorter conical subula, posterior coxæ approximate.

B. fuchsii n. sp. Bright brown, sparsely and coarsely pubescent. Length, 0.8 mm.

Head transverse, vertex half as long as the entire width of the head, base and frontal margin equally wide, parallel, genæ and lateral margin anterior to the eye equal in length and scarcely shorter than the eye, occiput convex, vertex from a line through the middle of the eyes to the frontal margin gradually depressed on either side leaving a slight longitudinal elevation in the middle and deepest near the supra-antennal tubercles in the form of a punctiform foveola; antennal cavities very large, separated by a clypeal septum, clypeus and labrum very short, transverse. Antennæ half as long as the beetle, joints 1—4 oblong, uniform, decreasing in size, 5—7 oval, decreasing in length, 8—10 transverse oval, gradually increasing, 11th as wide as 10th, ovoidal. Prothorax, impunctate, as wide as long, wider than the head, sides anteriorly arcuate, posteriorly sinuate, narrowest in a line through the lateral foveæ, which are situated in an ample longitudinal impression one-sixth of the length from the base, in the same distance in the middle is an obsolete transverse impression. Elytra very convex, not truncate at their apex, though the last segment is partly visible; base narrowly elevated, each elytron bifoveate, the suture near the base elevated. Abdomen with six ventrals, coxæ approximate, thighs slender, the posterior ones more so.

Santa Cruz, California. Charles Fuchs.

Motschulsky's *Scydmænus californicus* may belong to this, but it is reported as being $^{7}/_{8}$ of a Parisian line long, while this is 1 mm. shorter. According to the testimony of Dr. D. Sharp an unknown genus. I take pleasure in naming this insect in honor of its discoverer, my friend Carl Fuchs.

Scydmænus (?) minimus n. sp. Brown, slender, punctate, pubescent. Length, 0.45 mm.

Head widest in a line through the eyes, where it is one-third wider than the length from the base to the frontal margin, eyes large, not very convex nor prominent, equally distant from the base and the frontal tubercles, frontal margin nearly as wide as the neck, vertex broadly convex, antennal cavities large, leaving a narrow frontal septum between them, clypeus transverse triangular. Palpi with the third joint obconical, thick, the last a thick subula. Antennæ as long as the head and half of the prothorax conjoined, semigeniculate between the first and second joints which are nearly equal in size, the first oblong, the second globular, 3—7 globular, half as thick as the second, gradually increasing in width, 8 as wide as the second, 9 and 10 as long as the second and respectively two and three times as wide, truncate at the tip, the last joint as wide as the 10th, ovoid, truncate at the base. Prothorax as wide as long, sides evenly arcuate, base one-half wider than the neck, basal angles nearly rectangular, disk convex, minutely foveate near the basal angles and obsoletely transversely impressed near the middle of the base. Elytra two and one-half times longer and one-third wider than the prothorax, shoulders an obsolete longitudinal ridge, base of each elytron semi-circularely depressed. Legs short, all the coxæ approximate, the anterior ones contiguous, metasternum carinate.

Linn County, Iowa. 3 specimens sifted out of decayed wood. I am very much in doubt, whether this species can be retained in the genus *Scydmænus.*

Cephennium anophthalmicum n. sp. Amber-yellow, elongate, convex, impunctate, pubescence long, sparse, regular. Length, 0.9 mm.

Head pendant, as wide as long, vertex smooth convex, twice as wide as the distance from the base to the interantennal line; antennal tubercles flat triangular, clypeus quadrate; eyes wanting. Palpus with the first joint very narrow, cylindrical, three times as long as wide, the second not wider, globular, the third and fourth together thick, obconical, rounded at the tip. Antennæ as long as the prothorax, joint 1 and 2 oblong, obconical, nearly half as wide as long, 3 smaller, little longer than wide, 4—10 globular, 4–6 equal as wide as third, 7 somewhat larger, 8 smallest, 9 and 10 as thick as the second, the last joint slightly thicker, as long as 9 and 10 together, oblong oval. Prothorax nearly as long as wide, sides evenly arcuate, near the base slightly sinuate, basal angles rectangular, explanate, discus equally convex. Elytra a little more than twice as long and slightly wider in the middle than the prothorax, disc convex, lines wanting, suture near the base elevated with a large, pubescent fovea at the base in the middle of each elytron, scutel triangular, four times as wide as its length, shoulders obsolete. Anterior coxæ contiguous, prosternum broad, flat; mesosternum carinate, narrow, truncate posteriorly; middle coxæ small, separated by the mesosternal carina; metasternum very broad; posterior coxæ distant. Tarsi half as long as the tibiæ, the joints subequal, tibiæ strongly clavate, thickest in the distal third.

Alameda County, California. Sifted from vegetable debris together with a large number of *Pinodytes cryptophagoides* by Mrs. Marie Fuchs. One specimen.

PSELAPHIDÆ.

Pselaptrichus n. g. Antennal insertions approximate, front prolonged, narrow, sulcate. Maxillary palpus very long, the second joint sigmoid-clavate and coarsely tuberculate, the third small quadrate, the fourth broadly securiform, as long as the second with short erect pubescence.

P. tuberculipalpus n. sp. Yellowish brown, pubescence in regular rows, form slender, slightly convex. Length, 1.66 mm.

Head flat above, longer than wide, widest between the eyes, which are small and situated at the angles of a pentagon forming the discus of the vertex posterior to the oblong frontal prolongation; the latter nearly quadrate, arcuate in front, sulcate in the middle, the lateral half with the surface plane and inclined toward the sulcus; just before the eye-line are two small foveæ, mutually twice as distant as either from the eye and connected by a straight angular shallow sulcus with the frontal fissure; occiput slightly elevated with a fine carina in the middle, labrum small transverse, clypeus anteriorly trisinuate; antennal cavities large, from the middle of the eyes to the middle of the posterior limit of the antennal cavities a fine carina, and between those cavities a narrow frontal septum. Antennæ as long as the head and prothorax conjoined, joint 1 cono-cylindrical, half as long as the head, 2 oval, as wide as the first, 3—7 less than halt as wide as wide as the preceeding joints, globular, 8 wider, not longer, 9 transversely oval, 10 twice as wide as long, 11 oval, twice as wide as the second joint and one-half longer with long pubescence. Prothorax as long as wide and one-half wider than the head, widest behind the anterior third, where the sides are acutely rounded and toward the neck and the base nearly straight; disk moderately convex, near the base with an angulated transverse sulcus, ending on the sides in an ample impression, containing a small fovea. Elytra across the shoulders as wide as the prothorax, widest behind the middle, where it is one-half wider and along the suture one-third longer than the shoulderwidth; disk rather depressed near the base, sutural lines slightly impressed, basal foveæ small, the sutural ones near a transverse elevation of the base, the discal ones in the anterior part of a shallow, oblong depression, below the humeral ridge a fovea connected by an oblique line with the lateral margin. Abdomen as wide as the elytra, slightly convex without the basal impressions, segments subequal, border narrow. The pubescence of the elytra and the dorsal segment arranged in regular rows. Anterior coxæ contiguous, posterior ones distant, trochanters short triangular, legs slender, anterior femora crenate below tarsi with one claw, second joint twice as long as the third, metasternum not impressed. ♂ anterior tibiæ arcuate with a deep notch inside of the distal fourth of its length, clypeus with a medial ridge. ♀ tibiæ and clypeus simple.

Alameda County, California, discovered by Mrs. Marie Fuchs.

This singular insect unites some of the characters of *Bythinus* (*Machærodes*) *carinatus* and *Pselaphus longipalpus*, the antennæ and the palpi belonging to the European *Machærites* group of the *Bythini*, the form of the head approaching that of *Pselaphus*. According to the testimony of Dr. David Sharp, there is no genus known, with which it can be united.

Euplectus planipennis, n. sp. Piceous brown, abdomen and prothorax paler, much depressed, densely pubescent with fine appressed hair. Length, 1.25 mm.

Head triangular, anteriorly truncate, posterior angles strongly arcuate, eyes very prominent, as long as the genæ, base entire, across the posterior angles twice as wide as the straight frontal margin; frontal tubercles small, space between them and behind the frontal margin deeply concave, occipital foveæ large and connected with the frontal excacation by a very short sulcus, leaving in the middle of the vertex a short acute triangular elevation posteriorly continuous with the occiput. Antennæ one-half longer than the head, joint 1 and 2 nearly equal, rounded, longer than wide, 3—8 very transverse, equal, narrower than the second, 9 one-third wider, 10 twice as long and wide than the ninth, the last joint ovate, truncate at the base, one-third longer than wide, slightlp wider than the tenth, pubescence denser at the tip. Palpi short, yellow. Prothorax very broadly convex, nearly plane, punctulate, sides evenly rounded with the basal angles broadly arcuate, as long as the width of the head, the prominent eyes included, and less than one-fourth wider; disk nearly flat in the middle, an oblong fovea before the middle and large lateral foveæ just behind the middle connected by a fine, straight sulcus, running through a very small median fovea. Elytra one-half longer, across the high shoulders slightly wider, across the tip one-fourth wider than the prothorax, sides behind the middle nearly parallel; disk flat, depressed with declivous sides and tip, very densely pubescent, discal lines two-thirds long, very sharp and fine, the sutural line the same and entire, three basal punctures. Abdomen with the first and second dorsal bicarinate in the middle, carinæ including one-fourth of the segmental width. Legs short, yellow. ♂ with the last ventral nearly circular and an inconspicuous transverse impression at the base of the penultimate segment.

Linn County, Iowa.

Very distinct by the small head and the form and sculpture of the prothorax.

Euplectus? nova species? or variety of *Euplectus? armatus.*

This is a singular superscription full of doubt.

The specimens before me seem to be a variety of *Euplectus armatus* Lec. differing from the latter in the sculpture of the vertex, which has the foveæ in one specimen not connected by a sulcus with the transverse frontal impression, in the other there is a faint trace visible, most as in *Euplectus integer*, which it resembles in the whole form and convexity. Besides that, both specimens possesses other important characters of *Trimium*. They have only two basal punctures on the elytron and the first dorsal and second ventral segment is much longer than its neighbors, which in our *Trimium* is the case only in *convexulum* and the fourth dorsal is not perceptibly longer than the third; not at all like a true *Euplectus*, to which *E. crinitus* belongs. This all points to *Trimium* except the stronger border of the abdomen and the form of the antennal club, which latter is decidedly like *Euplectus*. This questionable form seems to be exceptionally North American of the Atlantic Slope. According to Reitter's schema we would have but one *Trimium* and the rest would be *Trimiopsis*. Sharp is unwilling to accept *Trimiopsis*. Those doubtful *Euplectus* would be *Trimium* except for the antennæ. What is to be done?

Constant characters of *Euplectus* are the prolongated fourth dorsal, which in reality is composed of two united segments, and is not connate with the last segment, the form of the antennæ and the third basal elytral puncture, together with the depressed general form. Constant characters of *Trimium* are the varying subequal, dorsal and ventral segments, the wanting prolongation of the fourth dorsal, which is connate with the last segment of the antennal club, and the Batrisus-shaped form of the body and two basal elytral punctures. This schema excludes the *E. arcuatus*, *integer* etc. which should be set down as *Pseudotrimium* (*Pseudoplectrus?* Reitter) having the 4th and 5th dorsal connate and six ventrals.

Trimium thoracicum n. sp. Saturated yellow, form slender, pubescence, very fine, abundant. Length, 0.9–0.95 mm.

Head narrower than the prothorax, one-fifth wider than long, genæ convergent, eyes not prominent, base impressed in the middle, frontal margin straight, a little more than half as wide as the width across the eyes, the foveæ in a line through the middle of the eye, mutually less than twice distant as either from the eye, circum ambient sulcus distinct, shallow, antennal tubercles small. Antennæ one-half longer than the head, the two basal joints not as strong as in *T. parvulum*, 8—10 equal in length, each twice as wide as the preceeding one, the last one-fourth longer than its width and twice as wide as the tenth, ovate. The last palpal joint in the outline securiform, but not compressed. Prothorax as long as wide, seemingly longer, equal to one and one-half the length of the head, widest before the middle, sides evenly arcuate, not perceptibly sinuate near the rather small lateral foveæ which are connected with the medial basal small fovea by a straight sulcus one-fourth the length of the prothorax from the base; disk evenly convex, finely and densely punctured. Elytra across the rounded shoulders as wide as the prothorax, before the tip one-third wider and the suture one-fourth longer; disk convex, base with two arcuate impressions leaving between them a broed longitudinal ridge, which in proper light may be traced to one-third of the elytral length. Abdomen with the first not longer than the second, very convex with two very short basal carinæ. Legs moderate, the intermediate thighs lunate, convex anteriorly and nearly straight posteriorly, compressed. The abundant pubescence makes the surface appear lustreless.

Iowa.—On moist rotten wood with ants. Abundant in the time of copulation in June. Differs from *T. puncticolle* by the impression on the occiput and the presence of abdominal carinæ.

Articerus californicus n. sp.

In size and color like *Articerus fuchsii* from Tennessee, but is more slender in form, the head in proportion shorter, the antennæ darker and slightly arcuate, the outlines of the tube-shaped last joint concave, which are in *fuchsii* straight lines, the antennal cavities sharper, limited before the eyes and the root of the basal segment less exposed. Otherwise in every respect like the well-known *A. fuchsii*.

Los Angeles, California.

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Note on Hæmatobia serrata R. Desv.

By S. W. Williston.

I have just learned, through the kindness of Professor Lintner, that the *Hæmatobia cornicola*, described by me in the September number of Entom. Americana, had previously been identified through Baron Osten Sacken with *H. serrata* R. Desvoidy, from France and Italy. I very much regret the synonym, which only adds another proof that he who treads on unfamiliar ground finds plenty of pitfalls. Suspecting, as I did, the identity of the two forms, I should have sent specimens for comparison. My only plea is that the multiplicity of my duties compels me to give up further study of our Diptera, for the time, at least. I leave them with the less reluctance, knowing that Mr. Coquillet and Mr. W. M. Wheeler are engaged upon them. Mr. Wheeler writes me that he is making an especial study of the Leptidæ, and I know he will be thankful for material.*

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* We shall have some remarks on this note in a future number.

SYNONYMICAL NOTES.

By Geo. H. Horn, M. D.

The species which follow are those described by Prof. E. F. Germar in the work with the title "Insectorum species novæ aut minus cognitæ," a book not in most libraries.

In all there are eighty-two species described from our fauna, forty-one of which retain the specific name. Of the latter fourteen retain the entire name while the remainder have been referred to other genera.

While nearly all of the synonymy below has been made known in a scattered way several names have been forgotten. Believing the publication useful from the convenience of having everything together so that it can be readily referred to, it is offered as a continuation of the series begun a number of years ago.

Insectorum species novæ—E. F. Germar.

Amara luctuosa, p. 10, = Chlænius tomentosus *Say.*
Chlænius erypthropus, p. 11.
Platynus blandus, p. 12, = Platynus cincticollis *Say.*
Pœcilus monedula, p. 18, = Pterostichus submarginatus *Say.*
Molops faber, p. 23, = Pterostichus.
Harpalus merula, p. 24, = Anisodactylus.
Harpalus stigmosus, p. 25, = Selenophorus palliatus *Fab.*
Bembidion intersectum, p. 28, = Tetragonoderus.
Dyticus biguttulus, p. 29, = Ilybius.
Dyticus maculosus, p. 30, = Laccophilus maculosus *Say.*
Gyrinus vittatus, p. 32, = Dineutus.
Buprestis pugionata, p. 37, = Dicerca.
Buprestis liberta, p. 38, = Chalcophora.
Buprestis dentipes, p. 38, = Chrysobothris.
Elater simplex,* p. 42, = Melanotus communis *Gyll.*
Elater semirufus, p. 45, = Limonius basillaris *Say*, *var. semiæneus* Lec.
Elater circumscriptus, p. 46, = Drasterius elegans *Fab.*
Elater rufilabris, p. 47, = Megapenthes.
Homalisus crenatus, p. 61, = Eros.
Lampyris rosata, p. 62, = Photinus pyralis *Linn.*
Telephorus luteicollis, p. 70.
Malthinus latipennis, p. 72, = Trypherus.
Dasytes trivittis, p. 76, = Odontonyx.
Dorcatoma bicolor, p. 79. (Unknown).
Clerus humeralis p. 80, = Hydnocera humeralis *Say.*
Trichodes apivorus, p. 81.
Silpha tuberculata, p. 81, = Silpha lapponica *Hbst.*
Dermestes caninus, p. 84.
Hister lævipes, p. 87.

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* Described from Brazil.

Macronychus variegatus, p. 89, = Ancyronyx.
Sphæridium melænum, p. 96, = Hydrobius globosus *Say*.
Ateuchus probus, p. 98, = Canthon.
Trox punctatus, p. 113.
Scarabæus Egeriei, p. 114, = Geotrupes.
Melolontha annulata, p. 121, = Anomala marginata *Fab.*
Melolontha liberta, p. 123, = Diplotaxis.
Melolontha hexagona, p. 124, = Dichelonycha elongata *Fab.*
Melolontha mucorea, p. 129, = Hoplia.
Upis perforata, p. 148, = Polypleurus.
Helops cisteloides, p. 159.
Helops æreus, p. 160.
Allecula erythrocnemis, p. 164.
Œdemera erythrocephala, p. 167, = Asclera.
Rhipiphorus cruentus, p. 168.
Rhipiphorus sanguinolentus, p. 169, = R. pectinatus *Fab.*
Mordella melæna, p. 169.
Rhynchites, ruficollis, p. 188, = Eugnamptus collaris *Fab.*
Cryptorhynchus aratus, p. 283, = Conotrachelus.
Balaninus pistor, p. 295, = Centrinus.
Calandra compressirostris, p. 300, = Sphenophorus.
Calandra larvalis, p. 301, = Sphenophorus cariosus *Oliv.*
Liparus picivorus, p 311, = Hylobius.
Pissodes nemorensis, p. 318, = Pissodes strobi *Peck.*
Pissodes macellus, p. 319, = Hylobius pales *Hbst.*
Tomicus calligraphus, p. 461.
Apate serricollis, p. 464, = Bostrichus.
Apate aspericollis, p. 465, = Amphicerus bicaudatus *Say.*
Sylvanus planatus, p. 466.
Lamia (*Tetraopes*) arator, p. 486, = Tetraopes canteriator *Drap.*
Cerambyx (*Purpuricenus*) Melsheimeri, p. 562, = Tragidion coquus *Linn.*
Callidium sanguinicolle, p. 515, = Batyle ignicollis *Say.*
Callidium miniatum, p. 515, = Batyle suturalis *Say.*
Callidium (*Clytus*) aspericolle, p. 517, = Neoclytus erythrocephalus *Fab.*
Leptura quagga, p. 521, = Leptura nitens *Forst.*
Leptura erythroptera, p. 522, = L. rubrica *Say.*
Leptura abbreviata, p. 523, = L. vittata *Oliv.*
Leptura distans, p. 524, = Euryptera lateralis *Oliv.*
Orsodacna armeniacæ, p. 526, = O. atra *Ahr. var.*
Crioceris sexmaculata, p. 526, = Lema sexpunctata *Oliv.*
Hispa flavipes, p. 529, = Odontota nervosa *Panz.*
Hispa pallipes, p. 529, = O. rubra *Weber.*
Cassida erythrocera, p. 540, = Porphyraspis cyanea *Say.*
Clytia ephippium, p. 548, = Anomœa laticlavia *Forst.*
Cryptocephalus semicinctus, p. 554, = Cryptocephalus quadrimaculatus *Say.*
Cryptocephalus lativittis, p. 558, = Bassareus lituratus *Fab. var.*
Cryptocephalus obsoletus, p. 559, = C. venustus *Fab., var. ornatus.*
Cryptocephalus picturatus, p. 560, = Pachybrachys.
Colaspis pilula, p. 567, = Nodonota.
Chrysomela puncta, p. 590, = Doryphora.
Galeruca fibulata, p. 601, = Luperus.
Haltica carinata, p. 610.
Lycoperdina vittata, p. 621, = Mycetina vittata *Fab.*

Preparatory Stages of Callosamia angulifera, *Walk.*

By Wm. Beutenmueller.

Egg—Ovoid, flattened above and below, white, shiny. Length 2 mm. width 1 mm. Laid July 2. Emerged July 11th.

Young Larva.—Head dull black with a transverse white band a little before the middle. Labrum also white. Cervical shield black. Body above and below wholly yellow, as are also the tubercles. As the larva grows older a pale blackish transverse band begins to appear on the junction of each segment. Length 3 mm. Duration of this stage six days.

After first moult.—Same as the preceeding stage, except the band on the first segment deep black, and the lateral row of tubercles above the spiracles sometimes black. Length 6 mm. Duration of this stage seven days.

After second moult.—The head is now pale green with two black transverse bands and the body pale whitish green with the dorsal tuberceles and the ones below the spiracles yellow. The tubercles above the spiracles black. The four tubercles on the second and third segments pale orange and much larger than the rest. The transverse band on the segments are now scarcely visible, except along the dorsum they are deep black. Underside semitranslucent, whitish. Length 14 mm. Duration of this stage four days.

After third moult.—The tubercles on the second and third segments are now coral red and the one on the eleventh segment yellow. All the remaining tubercles are reduced to piliferous spots. Length 22 mm. Duration of this stage seven days.

After fourth moult.—Little difference from the preceeding moult except that the tubercles are a little more prominent and having along the sides below spiracles a pale yellow stripe beginning at the third segment and running to the posterior extremity of the body.

Length 35 mm. Duration of this stage five days.

After fifth, the last moult.—No difference from the preceeding moult. Length 60 mm. Duration of this stage six days.

Food Plants. Tulip-Tree, (*Liriodendron tulipifera.*) Wild Cherry (*Prunus serotina*) and Sassafras (*S. officinale.*)

This larva closely resembles that of *Callosamia promethea.* But may be readily distinguished by the yellow lateral stripe and the less prominent tubercles on the second and third segments and also by the smaller piliferous spots which in some individuals are quite obsolete. The larva is also much stouter and larger than *promethea.*

The cocoon can only be separated from *P. promethea* by its larger size. Length 43 mm, width 20 mm.

PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S.

The Club began its regular annual session at 2 P. M. August 28th, 1889, in the Biological Building of the University of Toronto. There were present during the meetings, Messrs. C. J. S. Bethune, Wm. A. Bowman, A. J. Cook, H. Garman, Chas. W. Hargitt, L. O. Howard, P. R. Hoy, H. H. Lyman, J. Alston Moffat, E. Baynes Reed, Wm. Saunders, J. B. Smith, E. P. Thompson, and Clarence M. Weed.

The meeting was called to order by the President, Mr. James Fletcher, who then delivered the following annual address.*

At the close of the address attention was called to the absence of the Secretary, and on motion Clarence M. Weed was elected Secretary *pro tem.* A long discussion followed concerning the advisability of organizing such an association as was suggested in the President's address. Letters were read by the President from F. M. Webster, Herbert Osborn, A. H. MacKay, F. B. Caulfield, T. E. Bean, M. H. Beckwith, W. B. Alwood, W. H. Harrington, C. J. S. Bethune, J. B. Smith, and C. M. Weed. Mr. Howard also reported letters from F. L. Harvey, Lawrence Bruner, J. P. Campbell, C. W. Woodworth, C. P. Gillette, S. A. Forbes, E. J. Wickson, J. H. Comstock, all of whom heartily favored such an organization. Those present also expressed themselves in favor of it. On motion the Club then adjourned to 9 A. M., Thursday.

The Club met Thursday morning pursuant to adjournment, Mr. Fletcher in the chair, and proceeded to discuss the entomological matters touched upon in the President's address.

In reply to a query from Mr. Howard, Mr. Fletcher said he never bred any parasites from *Nematus erichsonii*, though he had bred thousands of this species. Mr. Howard said he was especially interested to learn, because a few years ago Dr. Packard described a *Pteromalus* parasitic on this insect which had since proved to be the same as a European parasite.

Prof. Cook and Mr. Howard reported the successful use of poisoned baits of clover and similar substances in destroying cut-worms. The former had tried it in general field culture in Michigan. Patches of clover were sprayed with Paris green water, then the clover was cut, placed in a wagon and carried to the field where it was distributed in forkfuls before the crop was planted. The cut-worms fed upon it and were killed. Prof. Smith reported that this method had also been successfully used in New Jersey. Mr. Fletcher called attention to the fact that the worms are not killed immediately but go beneath the soil surface about an inch where they die in course of a day or two.

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* Mr. Fletcher has not yet furnished the manuscript of this address, which we hope however to present in a future number.

Prof. Cook had also tried planting succulent plants in fields of grape vines and apple trees to prevent the climbing cutworms from injuring the buds, with considerable success. He had bred *Meromyza americana* from oats very frequently. Prof. Smith had often taken adult *Meromyza* in a sweep-net in New Jersey, but had not known it to do any serious damage. He said that the Wheat Midge did some injury in New Jersey.

Mr. Fletcher thought no remedy for the Wheat Midge had been suggested but that of destroying refuse. Prof. Cook advocated pushing the crop to rapid maturity. Prof. Saunders reported this pest very destructive in many parts of Canada. At Prince Edward's Island farmers plant either very early or very late to avoid it. Had lately seen many flies about infested heads which he supposed to be parasites.

Prof. Cook said that one of the most serious pests in Michigan was the wire-worm for which no successful remedy was known. One year's cultivation of buckwheat would not destroy them. He also asked how Chrysopa larvæ feed, reporting observations indicating that the juice of the victim was sucked in through the long jaws. Similar observations upon the mode of feeding of Syrphus larvæ showed that they partially roll themselves inside out, making a sort of funnel of themselves in sucking their victims.

In speaking of injury to Larches by *Nematus erichsonii*, Mr. Howard reported that Dr. Packard had figured in the forthcoming report of the U. S. Entomological Commission, Larches killed by repeated attacks of this insect, and added that there were Elms of the Department grounds at Washington, that had been defoliated year after year by another insect but yet were still vigorous.

Mr. Saunders reported that the bean crop had been badly injured by cut-worms this year.

Mr. Howard called attention to the ease with which parasites of scale insects can be carried from place to place.

Prof. Smith made some remarks on the structural peculiarities of the genus *Agrotis* tending to show that a loosely assembled mass of species is classed under this generic name. He described the variations in the palpi, the frons, the thoracic tuftings, the antennæ, the legs, the wing form and the general habitus, and showed that any definition of the genus based upon the existing assemblage would take in every Noctuid, with naked eyes and spinose tibiæ, hind wings not red or banded. He gave some of the characters upon which he had divided the genus and stated that a monographic revision of the species was completed in MSS. and about ready for the printer.

Mr. Weed then read the following:

EXPERIMENTS WITH REMEDIES FOR THE STRIPED CUCUMBER BEETLE.

By Clarence M. Weed.

[SUMMARY.]

(1). The article read by the author embodies the results of the first season's work on a series of experiments undertaken to determine the preventive or remedial value of various methods recommended to prevent the injuries of the Striped Cucumber Beetle, (*Diabrotica vittata.*)

(2). These methods are, for sake of convenience, divided into four classes, viz: (1), The use of offensive odors; (2), Mechanical coatings of the leaves; (3), Poisonous coatings of the leaves; (4), Enclosing plants under tents or gauze covered frames.

(3). The experiments were made on a large scale under ordinary field conditions, during the summer of 1889, when the Striped Beetles were exceedingly abundant.

(4). Five substances of the first class were tested, viz: hen manure, cow manure, kerosene, carbolic acid and bi-sulphide of carbon. None of these proved practically successful.

(5). Three substances of the second class were tested, viz: coal-soot, gypsum, und saltpeter. Of these coal-soot and saltpeter proved worthless, while gypsum showed some beneficial effect, not sufficient however wholly to save the plants.

(6). Three substances of the third class were applied, viz: pyrethrum, slug shot, and peroxide of silicates. Pyrethrum killed those beetles with which it came in contact at first, but soon lost its efficacy. Slug shot injured the plants to which it was applied. Peroxide of silicates had a decided effect in preventing injury, and where the plants had been well started before being attacked saved them from destruction. But it did not save them where the beetles were so numerous that they burrowed down to meet the sprouting plants.

(7). The results obtained from the fourth method — that of fencing out the insects by covering the plants with some form of tent or gauze covered frame, were by far the most satisfactory. The cheapest and most successful method employed was that of protecting each hill by a piece of plant cloth or cheese cloth about two feet square. This may be done simply by placing it over the plants and fastening the edges down by small stones or loose earth. It is better however to hold it up by means of half of a barrel hoop or a wire bent in the form of a croquet arch.

In the discussion which followed Mr. Howard reported that "X.O. Dust" — a patent combination of ground tobacco and some other substances — had been found a specific for the flea-beetle.

Mr. Smith reported that he had found the same substance an excellent remedy for the Horn Fly, Asparagus beetle larvae, and many other pests. Prof. Cook reported better success with tobacco decoction than dust Found the decoction the best remedy for use on domestic animals.

Prof. Cook read a paper giving an account of injury to furniture by a small beetle, *Lasioderma serricorne* not hitherto reported to have such habits.

The Club then adjourned to meet at 1:30 P. M.

At the appointed time the Club was called to order by the President. The following paper was then read by its author:

EXPERIMENTS WITH REMEDIES FOR THE PLUM CURCULIO.

CLARENCE M. WEED.

During the spring of 1888 I undertook an extended series of experiments with remedies for the plum curculio, and have reported the results of the first season's work in the Bulletin and Report of the Ohio Agricultural Experiment Station. The most successful method there recorded is that of spraying with London purple, the results indicating that about three-fourths of the cherries liable to injury by the insect can be saved by the treatment, and that as large a proportion of the plum crop as is desirable may thus be brought to maturity. These experiments were repeated this season, and I desire now to present some of the more important results, and to indicate the conclusions to which they point.

EXPERIMENTS WITH CHERRIES.

The principal experiment with cherries this year was a duplicate of the one carried on in 1888, the variety used being a half acre of Early Richmond trees in full bearing. Last year the west half of this orchard was sprayed and the east half left as a check. To eliminate any possible effect upon the results due to the difference in situation and exposure, this year I reversed the treatment, spraying the east half and leaving the west as a check.

So far as possible this experiment was made an exact duplicate of the one last season. During the time of spraying a great deal of rain fell both years, necessitating three sprayings where two ordinarily would suffice. The first two sprayings this year were made on the same dates as last—May 15th and 21st. — and the third a day earlier, — May 25th. A more dilute solution was used this season however, London purple being applied in the proportion of one pound to 160 gallons of water as against one pound to 100 gallons last year.

The cherries had begun to turn red June 4th, and the examination for curculio injuries began on that date, continuing until June 12th. One thousand cherries were picked from each of twenty-four trees in each half of the orchard, care being taken to select limbs in all parts of the tree and strip them thoroughly. Each tree was labeled with a letter, those on the sprayed portion being tagged as A, B, C. etc., and those on the unsprayed portion which corresponded in situation with those named being labeled A check, B check, C check, etc. As just stated, the checks were selected according to their situation, principally because this was the only practical way of doing it ; and though occasionally a tree and its check would hardly be fair comparison trees because of the difference in the amount of fruit borne by them, the total results could not fail to be correct.

The results obtained, so far as they relate to the injuries of the curculio, are shown in the following table, the columns 1000 being the number of cherries examined, and those to the right the number in each 1000 injured by the insect.

	Sprayed with London purple.		Check.	
Tree A.	1000	21	1000	113
“ B.	1000	27	1000	121
“ C.	1000	26	1000	75
“ D.	1000	22	1000	50
“ E.	1000	16	1000	220
“ F.	1000	28	1000	49
“ G.	1000	15	1000	46
“ H.	1000	6	1000	59
“ I.	1000	2	1000	40
“ J.	1000	13	1000	42
“ K.	1000	17	1000	30
“ L.	1000	6	1000	75
“ M.	1000	17	1000	97
“ N.	1000	6	1000	27
“ O.	1000	3	1000	57
“ P.	1000	18	1000	100
“ Q.	1000	15	1000	61
“ R.	1000	14	1000	82
“ S.	1000	26	1000	35
“ T.	1000	9	1000	31
“ U.	1000	19	1000	59
“ V.	1000	6	1000	81
“ W.	1000	17	1000	71
“ X.	1000	12	1000	60
	24000	360	24000	1483

Percentage .....1.5 Percentage......6.17

Percentage of Benefit......75.6.

That is to say these results indicate that 75.6 per cent. of the cherries liable to injury were saved by the treatment with London purple.

It will at once be noticed that the percentage of injury on the unsprayed trees (6.17) was very small, being less than one-half that of last year (14.15). This was probably due in part to the fact that the cherries ripened nearly a week earlier this year, the horticulturist having been picking for market June 11th, while last year it was necessary to wait until June 20th. The ratio between the injury on the sprayed and unsprayed trees, however, was nearly the same, the difference in the percentage of benefit for the two seasons being but .2 per cent.

In the second experiment this year two young trees of an unknown variety were used. They were situated on the south side of the orchard of Early Richmond trees; but were somewhat isolated and much exposed to curculio attack. The variety ripens considerably later than the Early Richmond and consequently like most late cherries it is much more liable to injury.

The trees were sprayed on the same dates as the others—May 15th, 21st and 25th, — and the fruit was examined June 14th. Neither tree bore much over a thousand cherries, so that they were practically stripped by the picking.

The cherries on the sprayed tree showed an injury of 22.6 per cent. while those on the unsprayed tree had been injured to the extent of 57.7 per cent., giving a percentage of benefit of 60.5.

I believe however, that better results would have been obtained had I waited some days to make my first spraying, and made each of the others later. A large proportion of the injuries on the sprayed tree had been made but a short time before the examination, probably after the last application of London purple had been washed off by the frequent rains.

EXPERIMENTS WITH PLUMS.

The plum experiment was not an exact duplicate of the one made last season because the main object this year was to discover some means of preventing the injuries of the Plum Fruit Rot (*Monilia fructigena*). Consequently a combination treatment was necessary. The trees of a half acre orchard containing four varieties were sprayed with London purple alone, in the proportion of one ounce to ten gallons of water, May 15th, soon after the petals had fallen. They were next sprayed May 24th, with a combination of London purple and the Bordeaux mixture, which treatment was repeated June 1st.

No check trees were left in the orchard on account of the fruit rot experiment, but two plum trees on the grounds a short distance from the orchard were left untreated. The latter set a good crop of fruit but it was entirely destroyed by the curculio, not a single plum being left to mature. The crop in the orchard however, was immense, one-half the fruit on many of the trees being artificially thinned, and then bearing so much that the limbs bent to the ground and in some cases broke on account of the great weight.

AMOUNT OF RAINFALL.

As already stated a great deal deal of rain fell during the period of spraying, necessitating at least one more application than ordinarily would suffice. The amount of rainfall during the period covered by these experiments—May 15th to June 14th—is indicated in the follow-table :

	Inches.		Inches.
May 19	.74	May 30	.90
“ 20	.16	“ 31	.13
“ 21	.01	June 1	.02
“ 22	.19	“ 4	.22
“ 23	.02	“ 7	.22
“ 24	.16	“ 8	.31
“ 25	.01	“ 9	trace
“ 27	.10	“ 10	trace
“ 29	.53	“ 14	.09

CONCLUSIONS.

This series of experiments carried on through two seasons upon two varieties of cherry trees and four varieties of plum trees, during which a grand total of 65,500 cherries have been individually examined, seems to me to confirm the conclusions provisionally announced one year ago, which may now be put in the following form :

(1). That about three-fourths of the cherries liable to injury by the plum curculio can be saved by two or three applications of London purple in a water spray, in the proportion of one ounce to ten gallons water.

(2). That a sufficiently large proportion of the plum crop can be saved by the same treatment to insure a good yield when a fair amount of fruit is “set.”

(3). That if an interval of a month or more occurs between the last application and the ripening of the fruit, no danger to health need be apprehended from its use.

(4). That spraying with the arsenites is cheaper and more practical than any other known method of preventing the injuries of this insect.

Mr. Smith called attention to the fact that in New Jersey there was no second brood of the Elm Leaf Beetle this season. Prof. Hargitt reported that peaches were seriously injured by the curculio in south-western Ohio this season.

Prof. Cook then read an extract from a Bulletin of the Michigan Agricultural College concerning spraying with the arsenites, showing that London purple in his experiments had injured foliage more than Paris green.

A long discussion followed concerning the injury of foliage by the application of the arsenites, in which various opinions were expressed, the most important point brought out being the necessity of an exhaustive investigation of the whole subject.

Prof. W. O. Atwater, of the Office of Experiment Stations of the Department of Agriculture, was then introduced to the Club, and gave a pleasant talk, especially with reference to the co-operation of his office with the recently organized Association of Official Economic Entomologists.

The election of officers then took place with the following result: President, A. J. Cook; Vice-President, C. J. S. Bethune; Secretary, F. M. Webster.

On motion of Mr. Smith the secretary *pro. tem.* was authorized to publish the proceedings of the Club in ENTOMOLOGICA AMERICANA.

The Club then adjourned to meet after the adjournment of the Biological Section, A. A. A. S.

On re-assembling, Mr. L. O. Howard read a paper entitled "On the Parasites and Predaceous Enemies of the Grain Plant-louse" in which he reviewed the previous literature and discussed at some length the rearing by the Division of Entomology, U. S. Department of Agriculture, of nine true parasites of *Siphonophora avenæ.* Illustrations of all of the species were exhibited, together with a full series of specimens. The paper was discussed by Mr. Saunders and Prof. Cook.

Mr. H. H. Lyman read a paper on "Variation in the genus Callimorpha," in connection with which he exhibited a large series of specimens and discussed at length the question of specific limitations. The paper was discussed at length by Prof. J. B. Smith.

A letter from Mr. Wm. H. Edwards was then read by the Secretary, giving the results of breeding experiments for the season.

The Club then adjourned *sine die.*

CLARENCE M. WEED,
Secretary pro tem.

The following letter was read by the President after adjournment, before the Association of Economic Entomologists:

"Amherst, Mass., August 26, 1889.

Mr. JAMES FLETCHER.

Dear Sir :—Will you please express to the members of the Entomological Club how great pleasure it would have given me to meet with them at Toronto and how deeply I regret that I am not able to do so, but I have only just returned from Europe and find so much to do in disposing of accumulated work, and also in working up my notes taken in Europe that I have no leisure moments for anything else.

The objects of my visit to Europe was were to study the types of North American Pyralidæ in the European museums, and also to get all the hints I could in economic entomology.

The most important collection of course, was that of Guenée which, after his death went into the hands of Mons. Charles Oberthür of Rennes, one of the kindest and most genial of gentlemen it has ever been my good fortune to meet. Here every facility was granted me for the study of his types which are in excellent condition, and they are preserved with scrupulous care.

The detour of the usual routes of travel—from London to Southampton, thence by steamer to St. Malo, cars to Rennes and then to Paris—took me through a part of France not often visited by Americans, a most quaint and interesting region, where the people retain all the old customs of their ancestors.

As is well known, a few of Guenée's species belonged to the collection of Lefebre, and to that of the National Museum. The Lefebre collection has been destroyed but I did not learn any of the particulars. However, as there were only four North American Pyralids in it, and as these are well known we shall not be affected by the loss. How much trouble the loss of the Lefebre collection may cause the students of the Macrolepidoptera, I do not know.

Upon my arrival in Paris, after calling on Mons. Ragonot, I went to the National Museum to see those two insignificant types of Guenée. Not even the Eiffel Tower nor the grand World's Exposition had any attractions for me as long as those two types were unknown. Upon making my business known to Mons. Lucas, he called his assistants and there followed a vast amount of "parlez-vous-ing" and head shaking which looked rather ominous. At last I was told that the types "did not exist any more," that "Guenée did not deposit any types there," and many other discouraging remarks, but I showed them in Guenée's Pyralites that those two types had been deposited there and tried to im-press upon them the fact that I had come all the way from America to see those two insects and that the proper thing to do was to make an exhaustive search. At last they concluded to look, and after searching for four hours, these types were found and brought to me.

Imagine my astonishment to discover that *Ebulia fumalis* Gn. was our well known *Botis badipennis* Grote, and that *Isopteryx applicalis* Gn. was *Isopteryx xeniolalis* Hulst.

It was true that Walker had names for nearly everything and where there was any doubt, he had given them several, but I had now obtained the oldest names and was sure of my ground. I could now ascend the Eiffel Tower in a happy frame of mind.

The journey into Switzerland along through the Alps and down the Danube to Vienna was a pleasure trip, a constant succession of enchanting views of the wildest natural scenery.

My object in going to Vienna was to see the types of Lederer's Pyralids. These were in several collections, all of which have finally been deposited in the Royal Museum except a few still retained in the collection of Felder in Vienna and a few in the collection of Zeller now in the British Museum. Some of Lederer's types have been destroyed, but I was able to see nearly all of his North American types.

The more I study the work of Lederer, with a knowledge of what his species really were, the less do I esteem it. I have waded through the introduction of his work on the Pyralidæ, which is devoted largely to disparaging the work of his predecessors, especially that of Guenée, and am led almost irresistably to the conclusion that when an author expends a large amount of his vital force in berating others, he has so much the less real force to put into the scientific part of his work.

I visited Dresden and Berlin with the hope that I should find some relics of the Hübner or Zincken collections, but I could find no trace of them, and am inclined to believe that they are entirely destroyed.

However this may ultimately prove, I believe I have been able to determine all of Zincken's North American Crambidæ and nearly all of Hübner's North American Micros.

There is one species of Geyer to which I desire to call the attention of our entomologists, and that is figured in Hübner's Zuträge, Figs. 733 and 734, under the name of *Eucosma tuberculana* from Georgia, presumably a Tortricid but I am very sure it is not. The figure of it in the copy of the Zuträge in the Library of the Buffalo Academy of Sciences, looks like a *Hydrocampa*, but the figure in the copy of the Zuträge in the British Museum looks more like *Eustrotia*. I feel confident that the thing is a Lepidopteron, but beyond that I do not care to express a positive opinion.

It may not have come from North America at all!

Many insects have been described as coming from North America, but when taken out and examined, the original label on the pin shows that they came from South America or some other part of the world. The older European entomologists had a very vague idea of this country, and even the modern European entomologists will sometimes make honest statements about this country enough to make one gasp as though he were in a vacuum.

Some authors have described their insects as coming from "Georgia in Florida" and Martyn in his Psyche in 1797 described a large number of well known Macros from "New Georgia."

The British Museum now contains three very important collections of Pyralids, viz: those of Walker, Zeller and Grote. All this material offers a golden opportunity to some of the Museum employees to make a complete revision of all the described species, both generic and specific, for they are at present in almost hopeless condition. If some one would take up the work and do it exhaustively, taking Lord Walsingham's paper on the North American *Anaphorinæ* or Meyrick's paper on the Australian Pyralids as models, a grand work would be accomplished, one that would cast that of Lederer's entirely into the shade.

The study of all these types shows what utter confusion our Pyralids are in, and I wish to forewarn our entomologists, that a large percentage of our names now in use will have to go into synonomy. Nearly all the names that I have myself given to our Pyralids will appear only among the tail-feathers, but I shall not feel lonely as I have most excellent company. What we have known as *Eurycreon rantalis* will have to struggle along under thirteen different names, and *similalis* Guenée will take precedence over all the others. This variable species must have delighted Walker's heart, for he gave it no less than seven different specific names.

Ten years ago I made myself familiar with the North American Tortricidæ in the foreign museums and have now done the same on the Pyralids and Crambids while Lord Walsingham has made us acquaintad with the Tineids and Feather-wings, and Mons. Ragonot is slowly at work on the Phycids. It now remains for some one to go over the same ground and discover all existing types of the Noctuids and Geometers and get the bottom facts on these families. We shall all bid God speed to Messrs. Smith and Hulst when they go on the mission.

In economic entomology I gained not a single idea. Europeans will have to come to this country to learn the most valuable things in this important branch. While in Berlin I went to the Zoological Gardens and observed that a common Bombycid moth (*Ocneria dispar*) Linn. was exceedingly abundant, flying about among the shade trees on the grounds, and visitors were catching and feeding them to the monkeys. I found one of the officials and learned that they were much alarmed at the ravages of this insect and were about to take active measures for their destruction. They proposed then to shower the trees with clear water to wash the moths down to the ground where they could be crushed. I asked whether they had used poisonous insecticides for the destruction of the larva but he said that they had not, and he had never heard of such a thing. I suggested that if they should liberate the monkeys and send them up into the trees they would destroy more than they could wash down.

This he took in sober earnest and explained to me at great length why the plan could not be successful. My joke was a failure.

The celebrated Insectarium in the Zoological Gardens in London was very disappointing to me. From all I had read of this establishment I was expecting to gain some very valuable hints on the best methods of breeding insects, but I was astonished at the crudeness of the whole affair.

Finally I think I have reason to feel proud of my American brethren, both the systematic and the economic workers, and trust they will continue their good work.

Hoping that you may have a successful meeting, I remain,

Yours truly,

C. H. FERNALD."

SYNONYMICAL NOTES.

By Geo. H. Horn, M. D.

In a letter from Dr. E. Bergroth, Forssa, Finland, my attention was called to the apparent neglect of a few North American Coleoptera, described by Drapiez in the "Annales générales aux Sciences Physiques" Brussels, 1819—1821, and to the fact that the name of but one of them appears in the Henshaw List. They are as follows:

Melolontha minima Drap., loc. cit., Vol. I, p. 291, pl. XI, fig. 2 = *Strigoderma pygmæa* Fab.

Lamia canteriator Drap., loc. cit., Vol. II, p. 47; pl. XVI. fig. 6, is now a *Tetraopes.*

Tenebris striatellus Drap., loc. cit., Vol. 5, p. 327, pl. LXXXIII, fig. 5 = *Nyctobates pensylvanica* De Geer.

Melolontha quadrimaculata Drap., loc. cit., Vol. VII, p. 276, pl. CIX, fig. 2 = *Anomala lucicola* Fab.

From the synonomy given it is very evident why the names have not appeared in Henshaw's List. There are very many other isolated description of our species which are not yet publicly accounted for, notably in the writings of Motschulsky, to which it is my desire to give ation when time can be spared from more serious work.

THE ASSOCIATION OF OFFICAL ECONOMIC ENTOMOLOGISTS.

The tendency to unite for mutual benefit and interest is so natural that whenever there are a number of workers in the same field, there is a natural movement in the direction of association. The creation of Agricultural Colleges and Experiment Stations all over the country — as well in Canada as in the United States has given to Economic Entomology an impulse whose extent is far-reaching and is hardly appreciated as yet. Many—in fact by far the greater number of stations and agricultural colleges have appointed an entomological officer, and the increase of workers thus caused, has resulted in a desire to unite for mutual benefit. The proposition for such a union, first mooted in Insect Life by Dr. Riley, met with little expressed favor at first, but every individual appealed to expressed himself favorably. By far the most enthusiastic on the subject was Mr. Fletcher, the able and energetic Entomologist of the Dominion, by whose efforts and after consultation with Messrs L. O. Howard and J. B. Smith a call was issued to all supposed to be interested in the matter for a meeting to be held in Toronto, during the meeting of the A. A. A. S., at which the matter should be discussed.

Favorable responses were at once received from nearly all states, and quite a large personal attendance was secured. On the 27th of August a lengthy meeting was held at which were present Messrs. J. Fletcher, C. M. Weed, A. J. Cook, J. B. Smith, C. J. S. Bethune, W. Saunders, L. O. Howard, H. Garman, C. W. Hargitt and others not officially interested. Letters were read from a number of gentlemen unable to be present, all favorable in their tendency, and expressing a desire to join such an association. Organization was effected by the election of Mr. Fletcher as Chairman, and Mr. Weed a Secretary, and full discussion of the matter in all its bearings was had. A formal resolution of organization was passed, and the following constitution was adopted.

CONSTITUTION.

1. This association shall be known as The Association of Official Economic Entomologists.

2. Its objects shall be (1), to discuss new discoveries, to exchange experiences and to carefully consider the best methods of work ; also (2) to give an opportunity to individual workers of announcing proposed investigations, so as to bring out suggestions and prevent unnecessary duplication of work ; (3) to assign, when possible, certain lines of investigation upon subjects of general interest. (4) To promote the study and advance the science of entomology.

3. The membership shall be confined to workers in economic entomology. All economic entomologists employed by the general or State Governments or by the State Experimental Stations or by any agricultural or horticultural association, and all teachers of economic entomology in educational institutions may become members of the Association by transmitting proper credentials to the secretary, and by authorizing him to sign their names to this constitution. Other persons engaged in practical work in economic entomology may be elected by a two-thirds vote of the members present at a regular meeting of the Association and shall be termed Associate Members. Members residing outside of the United States or Canada shall be designated Foreign Members. Associate or foreign members shall not be entitled to hold office or to vote.

4. The officers shall consist of a President, two Vice-Presidents and a Secretary, to be elected annually, who shall perform the duties customarily incumbent upon their respective offices. The President shall not hold office for two consecutive terms.

5. The annual meeting shall be held at such place and time as may be decided upon by the Association. Special meetings may be called by a majority of the officers, and shall be called on the written request of not less than five members. Eight members shall constitute a quorum for the transaction of business.

6. The mode of publication of the proceedings of the Association shall be decided upon by open vote at each annual meeting.

All proposed alterations or amendments to this constitution shall be referred to a select committee of three at any regular meeting, and, after a report from such committee, may be adopted by a two-thirds vote of the members present, provided that a written notice of the proposed amendment has been sent to every voting member of the Association at least one month prior to date of action. [SIGNED].

On Aug. 28th, a second meeting was held at which the constitution was formally signed by those present, and the following officers were unanimously elected: President, Dr. C. V. Riley, of Washington; 1st Vice-President, Prof. S. A. Forbes, of Illinois; 2nd Vice-President, Prof. A. J. Cook, of Michigan; Secretary, Prof. J. B. Smith of New Jersey. The Secretary and Mr. Howard were appointed a Committee to prepare By-laws, and after agreeing to meet at the time and place of the next meeting of the Association of Agricultural Colleges and Experiment Stations the Association adjourned.

So well started and in a field where so much remains to be done, the Association can scarcely fail of success — unless individual jealousies and ambitions cause its disruption.

ON THE DATE OF PUBLICATION OF WALKER'S AND ZELLER'S CRAMBIDÆ.

By Prof. C. H. Fernald.
Amherst, Mass.

The dates of publication of Walker's Crambites, Catalogue of Lepidoptera Heterocera, Part 27, and Zeller's Chilonidarum et Crambidarum genera et species, have been the subject of much inquiry and investigation.

Walker's work bears the date "March 2, 1863," and this has generally been considered the correct date of publication until recently. The date of Zeller's paper ts simply 1863, but the month is not given.

Before Prof. Zeller's death I wrote to him about various entomological matters, and among others asked him to give me the exact date of publication of his paper on the Crambids, but while he answered all the other questions in my letter he made no allusion to this, and I could not feel sure whether it was an oversight on his part, or whether he knew that his paper was published later than Walker's and did not care to say anything about the matter.

Zeller's paper was published as a part of a school programme, and I now have before me a complete copy of the work, including the programme and Zeller's paper. The translation of the title page is as follows: "Programme of the Public Examination of the Royal Realschool at Meseritz, to take place on the 30th of March 1863, to which are invited all friends of the institution, especially the parents and relatives of all the pupils, by the Director Dr. H. Loew.

Contents.

1. A scientific paper by Prof. Zeller.
2. School news by the Director."

Zeller's paper on the Crambidæ follows this title page and the school news comprising eight pages follows that.

This school news contains, under the title "Cronik," a record of the principal events that took place during the school year that began May 1st, 1862, and ends with a record of the death of a pupil on March 20, 1863, and his burial March 23d.

It is evident, therefore, that this work must have been printed after March 23d, and before the day of the examination, March 30th, 1863, therefore Prof. Zeller would naturally suppose that Walker's Catalogue which is dated March 2, 1863, was published before his paper.

The suspicion that the dates of the Museum Catalogues were not correct was given me by Lord Walsingham, and I at once wrote to Mr. Butler who had the kindness to examine the Museum Records, from which he learned the following facts: "Volume 27 of Cat. Lep. Het. was ordered printed Feb. 14, 1863. The volume was received from the printer and the price fixed on it, April 18, 1863." This date surely must be regarded as the date of publication, for it could not be considered as published till after it was printed and was offered for sale.

This seems sufficient to establish the fact that Zeller's work on the Crambids was published at least eighteen days before that of Walker.

From the same Records Mr. Butler learned that Part 28, Cat. Lep. Het. bearing the date of Oct. 19, 1863, was not received from the printer and offered for sale till Dec. 19, 1863. and Part 29 of the same work, bearing the date of March 7, 1864, was received from the printer and offered for sale June 25, 1864.

Notes and News.

Phytonomus punctatus has made another start. It appeared this year for the first time near Philadelphia, all the local collectors taking it. I received the larva early this season from the north-eastern section of New Jersey. It does not seem to have done much damage.

* * *

This has been a good season thus far for fungoid diseases of Insects. Thousands of larvæ of the Elm Leaf Beetle have been destroyed in New Brunswick by such diseases. The reverse of the picture is that potatoes are suffering worse than the beetles, and we are more fond of the former than we hate the latter. We are not good at hating anyhow!

* * *

Has any one ever noted that urticating larvæ of Lepidoptera lose this power when parasitized? A parasitized specimen of *Empretia stimulea* was brought me recently, which I found I could handle with absolute impunity.

* * *

Sitones hispidulus another imported pest has been for some little time known as occurring along the sea shore; this year it has taken a start and has been quite commonly taken inland. I am informed that it is quite abundant near Washington, and I have taken it myself in some numbers near New Brunswick. The larva feeds on the roots of clover.

* * *

Raphiteles maculatus Wlk., was bred by me this season from *Pissodes strobi*, upon which it is an external parasite. Mr. Howard, to whom I owe the determination, says it has been heretofore bred only from *Scolytus rugulosus*.

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NOTES ON THE HABITS OF BUPRESTIDÆ.

By Frank H. Chittenden.

In a list of the Buprestidæ of New England published in the present volume of Entomologica Americana (p. 29) the author—Mr. Frederick Blanchard—remarks that many species noted as occurring on the pitch pine (*Pinus rigida*) and at the same time as breeding in the white pine (*P. strobus*) may breed indifferently in either.

In my experience in collecting Coleoptera that infest these trees, I have noticed that while some species evince a preference—e. g. the weevil *Pissodes strobi* for *Pinus strobus*, or the longicorn *Rhagium lineatum* for *P. rigida*—few, if any, are restricted to either tree, but in the event of a scarcity of the favorite food plant, will attack other Coniferæ.

To the list of Buprestidæ mentioned in the article referred to, as infesting either *P. rigida* or *P. strobus* I add the following: *Chalcophora virginiensis*, breeding in *P. rigida*, *Dicerca punctulata*, breeding in *P. rigida*, and frequenting the trunk and foliage of *P. strobus*, *Buprestis striata*, breeding in *P. rigida*, and *Chrysobothris floricola*, frequenting *P. strobus*.

Unless otherwise stated the following mentioned species were collected at Ithaca, N. Y., on the dates given.

Chalcophora virginiensis Drury, *C. liberta* Germar, and *C. fortis* Lec., appear during the first warm days of May, when they may be seen on walls and fences or flying in the noon-day sun. Of *C. liberta* I have a specimen taken April 3rd, 1882, both *liberta* and *virginiensis* are common in May and June, they occur also throughout July, and have been taken as late as August. From what I have been able to learn, it seems that these species disappear, practically, at the end of July and re appear in the following Fall. This would indicate that there are two broods, one appearing in the Spring and disappearing in July or August and another in the Fall, which disappears with the approach of cold weather. So far as I know, there is no record of the hibernation of the last brood.

C. virginiensis and *C. liberta*—I have observed on the foliage of white and pitch pine as late as Oct. 10th, and specimens have lived under my care feeding on the needles of the latter, for which they show a preference, till toward the close of November.

C. campestris Say.—Several years ago Mr. John Akhurst of this city found some forty or fifty examples of this species at West Hoboken, N. J., sunning themselves on a large dead tulip tree. The species is also known to attack sycamore trees (Ent. Am., vol. II, p. 71,).

Omitting *campestris* and *fulleri* which form one group, if not a single species, the remaining species of the genus may be placed in a second group, which from their known habits, and close relationship, we have good grounds to believe do not differ materially from each other biologically, but like *liberta* and *virginiensis* pass the larval condition in the wood of pines and the adult stage on the foliage of the same trees. Compared with *Chrysobothris* and *Anthaxia* the species of this genus are very sluggish, and do not take readily to flight, but, like many other Coleoptera, when disturbed, fold their legs and antenuæ closely to their bodies, and drop to the ground, where they may easily be captured.

Dicerca divaricata Say—Fitch in his third report on the insects of New York remarks that the beech tree is undoubtedly the original residence of this insect. I have noticed it oftener on this tree than on any other, but have taken it also on apple, maple, and oak. It appears to frequent particularly trees with light colored trunks, which harmonize well with the color of the insect and may serve to protect it against detection by its natural enemies.

D. pugionata Germ.—Two examples taken on trunks of maples. June 5th and Sept. 27th.

D. asperata Lap. & Gory.—Several specimens taken on dead hickory suggest that the species may breed in this wood as well as in oak. May 20th.

D. punctulata Sch.—A living specimen taken in the interior of a large branch of *Pinus rigida* Sept. 15th. Also occurs quite commonly on the leaves and trunks of *Pinus strobus*. Captures on May 10th, June 15th, and Sept. 5th–20th.

Anthaxia viridifrons Lap.—Bred from a pupa taken from a dead branch of shag bark hickory (*Carya alba*) May 14th. Two days after capture it had transformed but remained inactive for nine or ten days afterward, until the 28th, when it began moving rapidly around in the bottle in which it was confined

From these observations it may be concluded that the insect normally passes some time after transformation in comparative inactivity, and probably does not issue from the wood in which it breeds until at least two weeks after arriving at maturity.

A. viridicornis Say.—Observed on elm leaves June 11th—18th. *A. viridifrons* is noted as occurring on elm also (Ent. Am. vol. V, p. 31).

A. cyanella Gory—Bred from chestnut twigs. May 11th.

A. quercata Fab.—Observed on leaves of chestnut and chestnut oak during June and July.

For convenience I have assumed that the species of Anthaxia above mentioned are distinct, though there are good reasons for the belief that *viridifrons* and *viridicornis* are sexes of a single species, and *cyanella* and *quercata* constitute in like manner another species.

Chrysobothris femorata Fab.—To the list of half a dozen trees noted as being infested by this species I add hickory, having cut the imago from the larval passages in the wood. It was taken during the past season at Staten Island on a log of white birch, May 17th and I have no doubt it breeds in this wood also.

C. dentipes Germ.—From the uniformity and frequency of the occurrence of this insect on pines, it is doubtful if it breeds in any but coniferous trees, although Harris (Ins. Inj. to Veg. p. 49) states that it inhabits the trunk of *oaks!*

C. sex-signata Say.—One specimen cut from a beech tree in which it had bred. In the list previously referred to (p. 31) this species is mentioned as having been beaten from pitch pine.

C. azurea Lec.—Taken by Mr. A C. Weeks on dead sumach (*Rhus toxicodendron*) on Long Island and Staten Island, N. Y. in June.

Acmæodera culta Web, like other species of the family is peculiarly a sun beetle. I have repeatedly examined the flowers of *Geranium maculatum* in the shade without ever discovering a single specimen, while the flowers that were exposed to the sun fairly swarmed with the little beetles. They eat the petals of this plant and of the wild rose also. June and July.

Agrilus egenus Gory.—Bred in great numbers from the twigs and smaller branches of the common locust tree (*Robinia pseudacacia*). The larvæ form mines under the bark, eating both bark and wood. Some little time is required by the imago to issue from the wood. On one occasion, May 8th, many specimens were observed with their heads, and in some cases, thorax and anterior legs projecting from the bark, and some were still to be seen in that position two days later. Of the beetles breeding in confinement two were found dead as early as April 21st, a larva was taken as late as May 4th and a pupa was placed in alcohol May 22d. The adult insects feed upon the leaves of the locust. Latest capture was on June 21st.

Brachys ovata Web.—Mines the leaves of oaks. I have seen one specimen bred from an oak leaf.

B. ærosa Melsh.—Occurs commonly on elms.

My observations on the following species coincide substantially with Mr. Blanchard's list. *Dicerca lurida* Fab., under stones in early spring. *Chrysobothris scabripennis* Lap. & Gory on white pine in May and June. *Eupristocerus cogitans* Web. on alder, *Agrilus bilineatus* Web. and *A. interruptus* Lec. on oak, and *A. politus* on willow.

Cryptocephalini found on Ceanothus Americanus.

The following is a list of some of the species of Cryptocephalini taken at Ithaca, N. Y. in July on the New Jersey tea plant (*Ceanothus americanus*). *Babia 4-guttata* Oliv., *Bassareus mammifer* Newm., *Cryptocephalus 4-maculatus* Say, *C. binominis* Newm., *C. quadruplex* Newm., *C. venustus* Fab., *C. mutabilis* Melsh., *Pachybrachys othonus* Say, *P. trinotatus* Melsh., *P. sobrinus* Hald., *P. luridus* Fab., *P. infaustus* Hald., *P. femoratus* Oliv., *P. subfasciatus* Hald., *P. tridens* Hald. (one specimen). *Babia 4-guttata* occurred in considerable numbers on the leaves, which they had devoured quite badly; of the other species, some were found on the leaves, some on the flowers, and many were observed on all parts of the plant.

Many other Coleoptera frequent *C. americanus*, among others many species of Mordellidæ, Malachiidæ and Cistelidæ. *Cistela sericea* Say, often occurs in such numbers as to almost exclude all other species.

F. H. C.

A Stridulating Carabid.

Having recently seen a statement that *Cychrus*, *Nomaretus* and *Harpalus* among the Carabidæ of this country are known to stridulate, I may add to the list, *Omophron*. During the past season I have repeatedly observed the habit in *O. americanum*, Dej. and I have no doubt that many other genera will be found to have stridulating habits, if collectors will only be careful to observe them before consigning them to the alcohol or cyanide bottle.

F. H. C.

A Vulnerable "New Species."

By Eugene M. Aaron.

In his "Contributions to Science," Vol. I, No. 2, July 1889,* Mr. Chas. J. Maynard, the author of the "Butterflies of New England," describes as a new species an extreme form of *Agraulis vanillæ*, which has long been recognized by collectors as commonest in the West Indies. This description, under the name of *A. insularis*, affords an interesting instance of what can be done in the creation of new species if one assumes that an extreme form is a constant one, and then advances to the work without sufficient acquaintance with the literature, already sufficiently full.

The following remarks from this description are quoted as pertinent to this paper:

"I can find no description of any species of *Agraulis* from the West Indies, and Kirby does not even give *vanillæ* as occuring there." * * *

"General pattern of coloration similar to that of *A. vanillæ*, but the ground color is paler, the size smaller, and the wings are broader in proportion to the length." * *

"Dimensions: ♂ *insularis*, spread of wings, 2.40; primaries, 1.20 long by .65 wide; secondaries, .75 long by .78 wide. Antennæ, .60 long. Length of body, including head and palpi, .80. ♀, spread of wings, 2.50; primaries, 1.35 by 80; secondaries, .80 by 80."

"Average *vanillæ*: ♂, spread of wings, 3.00; size of primaries, 1.60 by .80; secondaries 1.00 by .80. Antennæ, .70. Length of body, 1.20. ♀. spread of wings, 3.40. Primaries, 1.60 by .80; secondaries, 1.20 by 1.00." * * *

"*Insularis* differs from it (*vanillæ*) in being paler, in having the two inner spots in the central cell fused together, these being separate in *vanillæ*, and in having only two white dots in the lowest spot." * * *

Alluding to the dimensions: "This is especially discernible in the secondaries, which are not only as broad as they are long, but are sometimes actually wider than long, whereas in *vanillæ* the reverse is the case and the secondaries are always narrower than long. * *

"Yet I have never seen a specimen (*vanillæ*) east of the Gulf Stream."

Accompanying this description is a plate, seemingly photo-engraved and colored by hand, giving figures of typical ♂ *insularis* and ♂ *vanil-*

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* Received at the Philadelphia Academy of Sciences, Oct. 10th, 1889.

læ, above and beneath, and the chrysalis of the latter. These are sufficiently accurate to identify either or both as *vanillæ* but not sufficiently exact to serve to clearly illustrate the very minute differences on which this species depends for its future life.

Taking the above questions in their order, we first come to the very remarkable statement that our author can find "no description of any species of *Agraulis* from the West Indies." Such Fathers of our Science as Linné, Fabricius and Cramer, credited *vanillæ* to "America" in general; and Linné quotes it as from Georgia and from Surinam. Boisduval and Leconte say: "It also inhabits the Antilles and nearly all of South America." Passing by the median ground of such authors as La Sagra, Herrich-Schaeffer, Geyer, Poey, *et al*, all of whom have referred *vanillæ* to the Antilles, we come to such recent writers as Bates, who in his "Nymphalinæ of the Amazon Valley", (Journal of Entomology, No. 4, June 1864), says of *vanillæ*: "This well-known and very common species has the widest range of all the members of the *Calænis* and *Agraulis* groups, being found throughout Brazil, and as far north as the Southern States of North America, including the West Indies." Following him, Butler, in his indispensible work on the Fabrician types in the British Museum reiterates this wide extent of its range. In his "Annotated Catalogue of the Diurnal Lepidoptera of the Island of Cuba," Senor Don Juan Gundlach, (Papilio, Vol. I, pp. 111–115,) gives *vanillæ* a place in the rich fauna of that island, where it is well known to collectors to be not uncommon. And to end with Kirby, our author notwithstanding, does give *vanillæ* as occurring in the West Indies in the very comprehensive habitat "Georgia ad Braziliam."

During a residence of several years in East Tennessee *Agraulis vanillæ* was observed by me to be one of the commonest species in that region and as it was one of the hardiest it was raised by me in greater numbers than any other butterfly. This experience taught me that there was a very considerable range of variation in the relative proportion of darker scales which make up the spots and marks, and in the nacre scales which beneath give it the silvery-spotted character. There was also a considerable variation in the size and, I now notice on looking through some of this material, also a variation in the proportions of the wings, the females inclining to greater robustness in this particular.

Tabulating the differences pointed out by Mr. Maynard as distinguishing these two species we have the following:

CHARACTERS.	*Vanillæ.*	*Insularis.*
1. Ground Color :........	....	Paler.
2. Size :	....	Smaller.
3. Proportionate breadth of wings :	Always narrower than long.	Broad as long.
4. Inner spots in cell of primaries :	Separated.	Fused.
5. Number of white dots in same cell :	Three.	Two.
6. Habitat :	West of Gulf Stream.	East of Gulf Stream.

Now let us with a considerable material before us question these characters, and see whether they are of such nature as to warrant their being elevated into the specific ranks. First, as to ground color. No one should know better than our author, who has travelled and collected over a large extent of territory, the illusiveness of this character. As a matter of fact his plate fails to show any difference in the general shade of the two species and our comparisons of a large series covering a wide geographical range points out the fact that while the West Indies seem to afford a greater number of pale males and less suffused females the United States also furnishes no inconsiderable number. The palest specimen we have yet seen is a ♂ in the collection of the American Entomological Society from Georgia. Oddly enough the most brilliant and deepest tinted specimen in that collection is from those taken by Dr. Abbott at Samana Bay, Hayti.

Second, as to the relative size. While our author's plate shows an even greater variation than his text would indicate in this particular, and while it is evident that there is a considerable difference in this particular and in the outline of the wings if the two forms are constant, here again it is found that the intergrades are a formidable factor—predominate in fact, the extreme forms being unusual either on the main land or the islands. A lot of starved larvæ of *vanillæ* turned out a lot of males in Tennessee in 1877, which on an average measure considerably less than the dimensions given for *insularis.* The effect of such a climate as holds in the Greater Antilles on both the size and suffusion of markings of a species has already been fully pointed out by me in Papilio, Vol. 4, pp. 26—30.

In the third case, we find the proportionate dimensions of the wings relied upon as another character on which this species is to be based. All Lepidopterists must know that this is a very variable feature; one that can at times be relied upon as pointing out the sex, but never a secure foothold for the student of species in the Rhopalocera. In some species the seasonal broods vary considerably in this particular, but even then it is not a safe guide, as only by the careful measurement of thousands of specimens would it be safe to declare the "average" of any form. This whole question of relative proportions has been treated of over and again, but no one has done it in a neater manner than has Prof. S. H. Peabody, who, in the Canadian Entomologist, (Vol. 8 pp. 141-148,) comments on the genera of Mr. Scudder's "Systematic Revision." He thus sums up the question: "Can they mean that any difference which can be formulated in the ratio of length to breadth in the same part, or of length of one part to length of another part, is a difference of ultimate structure? * * Does this principle extend through Zoology? Is Gen. Sheridan, who is short and stout, and who, according to President Lincoln, can scratch his ankle without stooping, generically, different from Gen. Sherman, who is tall and slender, and whose ankles are evidently out of his reach?"

Now for the markings. The fourth character consists of separated spots in the interior pair in the cell of the primaries of *vanillæ*, while in *insularis* they are fused. It is the fusion of such spots or bands that forms our common black variety of *Papilio turnus-glaucus*. Melanism has long been too well understood as an aberrant or at best varietal disposition on the part of many butterflies to merit its elevation to a specific character from so slight an example of its display as here afforded. At most these spots of *vanillæ* have but to thicken to a one-half greater radius and they have joined. The pale specimen, already alluded to as from Georgia, has not only these two spots fused, but the black scales thicken and run along the lower margin of the cell, join the two outer spots, which are also fused, in a loop and then these four are joined to the outer and upper of the three spots usually found across the disk. Thus they form a rude, tip-tilted, written letter Y.

As a fifth consideration of importance we have the fact offered that in *insularis* there are but two white dots in the four spots contained in the cell of the primaries while in *vanillæ* the lower of the inner two is also pupilled, making three spots in that species. Were Mr. Maynard a resident of this vicinity we should much like to show him *insularis*, typical in this respect, from Tennessee and the North Carolina mountains. But a hasty glance through the specimens at our disposal shows that the two spotted form is as liable to turn up from Brazil, Mexico, Hayti, Cuba, New Grenada, or our Southern States. It is as vain to hope for constancy in this particular as it is in the suffusion of the already closely placed spots. Every possible form from one very faint white ocellus to four distinctly marked ocelli may be found. In some of the black spots, which to the naked eye seem devoid of any trace of ocelli, the pocket lens will show an occasional white scale; present as a veritable mocker at the stability of "*insularis*, n sp."

The sixth characteristic, if such it may be termed, viz: habitat, has already been exploded by what we have said of the authorities who have given *vanillæ* a home in the Antilles. To that list might be added such well known catalogues as Dr. Strecker's "Butterflies and Moths of North America," and Mr. Scudder's "Synonymic List of American Nymphales." Both of these authors give the Antilles as a habitat for *vanillæ*, as does also Snellen in his report on the Diurnals found on the Island of Curacao, in the Tidschrift voor Entomologie, Vol. 30, p. 20. One naturally wonders who the authors were that Mr. Maynard consulted on this subject, when such well known and constantly used works of reference were overlooked. There are four species of the *Agraulis* group that are known to have been found in the West Indies.

Before closing this paper it will be of interest and will still further show the uncertain condition of this "new species" to offer a few notes on some of the more remarkable specimens over which I have looked in preparing this paper. Two specimens from "Hacilada de Bledos", Mexico, (Dr. Palmer) have unusually bright red coloring and deep markings, but they also have the *insularis* measurements In one of these there is a pupil in both of the inner cell-spots, and none whatever in either of the outer. Two specimens from New Grenada, in the Titian R. Peale collection, have but one white spot; in general color they are *insularis*, but in measurements and proportions they are *vanillæ*. Two from the Island of St. Thomas and three from Cuba (all in the Peale collection) are all of the *vanillæ* form. In the St. Thomas specimens there is a tendency to entire obliteration of the ocelli. One of the specimens from Cuba ("from Ramon de la Sagra, 1833") has 3 ocelli, and another from the same island is a typical *vanillæ* in every particular. A specimen from Guanoxuato, Mexico ("Prof. Millington, 1835") has the inner spots apart more than their own width. Beneath it is peculiar in that it has the outer spots in cell fused into a large tripartate nacre spot with a black inter-bordering. A specimen from San Domingo (Frazar) though of the *insularis* form has the inner two spots not only widely separated, but has the lower one nearly wanting, thus presenting the very opposite of fusion.

"The King is dead! Long live the King!" carried hope and joy to many hearts. Not so, "The new species is dead; long live the synonym." Perhaps no feature of the study of entomology carries greater terrors with it than does the mastery of the overburdened synonymy. Many a good student and capable naturalist has turned away from it all in disgust and what has been the gain of some other science has been our loss. All of which teaches the lesson that should be ever before us —there are many writings of the Fathers in Entomology to be searched through, large public and private collections to be examined, and an enormous mass of current literature to be mastered before it is safe to say that at present less than one half the species described in the last ten years outside of Africa, are likely to maintain their specific validity, and no inconsiderable portion of these new species are built on synomical piles that are already reared nigh unto toppling.

In closing I wish to state where the names of *vanillæ* and *insularis* are used herein, they are used in the sense employed by Mr. Maynard. There is no doubt in my mind that it was the insular form, in an extreme departure, that was originally used as the type of *vanillæ* and it is that which should be known as such. If it is thought best to separate as a variety our North American continental extreme form, that should be called *passifloræ*, as was done by Fabricius in 1793.

◆

FOOD-PLANTS OF LEPIDOPTERA, No. 12.

(Samia Cynthia Dr.)

By William Beutenmüller.

Rutaceæ.

Ptelea trifoliata *L.* (Hop Tree).
Phellodendron amurensis *Rup.*

Ilicineæ.

Ilix opaca *Ait.* (American Holly).

Simarubeæ.

Ailanthus glandulosus *Desf.*

Magnoliaceæ.

Liriodendron tulipifera *L.* (Tulip Tree).

Berberideæ.

Berberis vulgaris *L.* (Barberry).

Tiliaceæ.

Tilia americana *L.* (Basswood).
" pubescens *Ait.*
" Europeæ (European Linden).

Sapindaceæ.

Acer pseudoplatanus *Linn.* (Maple).

Rosaceæ.

Prunus serotina *Ehrh.* (Wild Black Cherry).
" Virginiana *L.* (Choke Cherry).
" domestica *L.* (Cultivated Plum).
Spireæ sp.

Hamamelideæ.

Liquidambar styraciflua *L.* (Sweet Gum).

Cornaceæ.

Cornus stolonifera *Michx.*
" florida *L.* (Flowering Dog-wood).

Laurineæ.

Sassafras officinale *Nees.* (Sassafras).
Lindera Benzoin *Meis.* (Spice-bush).

Caprifoliaceæ.

Viburnum Lentago *L.* (Nanny-berry, Sheep-berry).

Euphorbiaceæ.

Ricinus communis (Castor-oil Plant).

In addition to the above list of food-plants of *Samia cynthia,* the species has also been recorded to feed upon various other plants. But as the list only contains such plants of my own observations, the following were omitted : *Rhus* (Sumac), *Anagallis* (Pimpernel), *Lonicera* (Honey-suckle), *Euonymus* (Spindle Tree), *Celastrus scandens* (Bitter-sweet), *Salix* (Willow), and Celery.

◆

Society News.

Brooklyn Entomological Society. Sept. 3rd, 1889. Nine members present. President Casey in the chair. The loan by Prof. Julius E. Meyer of his fine collection of Lepidoptera, the result of some thirty years of labor, to the Institute, was reported. Capt. Casey related incidents of recent collecting of *Staphylinidæ*, *Pselaphidæ* and *Scydmænidæ* in Rhode Island, particularly with reference to *Euæsthetus* and *Trogophlœus*, the ♀♀ of the former genus exhibiting clearly defined specific differences—proving the correctness of the species lately described by him. Discussion followed on the habits and methods of collecting minute Coleoptera, in which Messrs. Casey, Chittenden and Weeks took part.

Mr. Angelman exhibited a specimen of *Prionidus cristatus* known as the "wheel bug," then occurring in the New Jersey peach orchards.

Mr. Doll exhibited a hermaphrodite specimen of *Callosamia promethea*, the right pair of wings and the right antenna being those of the ♀ and the left of the ♂ except a rectangular blotch or break on the secondary disclosing the marking and coloration of the ♀. The maculation of the ♀ prevailed beneath.

Mr. Weeks read a paper entitled "How to catch butterflies," indicating the method of capturing them intact by the use of a large net and appropriate cyanide jar. After general discussion the meeting adjourned.

* * *

October 1, 1889.—Meeting at Brooklyn Institute. 16 persons present. President Casey presiding. Messrs. H. S. Woodman, Julius E. Meyer, W. C. Wood and Rev. J. L. Zabriskie were elected members of the Entomological Department. Mr. Weeks stated the percentage of certain lepidopterous larvæ destroyed by *Tachina*, so far as his experience went, to be about 66. Prof. Smith noted the remarkable spread this year of *Phytonomus punctatus*; the reported localities in New Jersey in which the 17-year locust had appeared; the increase of *Sitones hispidulus*, upon clover roots, and the importation of a cattle fly, and also related his experience in collecting from the surface of water during the process of flooding a cranberry bog. Insects in great numbers of many species appeared where nothing was previously visible. Podurids covered the surface so densely that *Staphylinidæ*, *Scydmænidæ*, *Pselaphidæ*, *Carabidæ*, *Coccinellidæ*, and other families were supported by them. A favorable wind finally blew the floating mass to an angle in the shore where it gathered in a heap and rendered collecting easy and profitable. Mr. Palm expressed his opinion relative to collecting in Northern Germany. Dr. Zabriskie had observed *Corixa* attracted by light and entering the room through a window screen. Mr. Beutenmüller had taken what he supposed to be *Euphanessa meridiana*, natural habitat Florida, and also described the difference between the larvæ of *Callosamia angulifera* and *C. promethea*. Capt. Casey gave blackboard illustrations showing the structural differences of the secondary sexual characters of *Stenus* and *Euæsthetus*, a specimen of which latter Mr. Weeks exhibited. Prof. Smith commented upon the importance of sexual characters as a basis of determination. Adjournment.

* * *

November 5, 1889.--Meeting at Brooklyn Institute. 17 persons present. President Casey presiding. Minutes of October meeting approved. The following persons were elected to membership in this department: H. S. Harbeck, N. Y. City; H. F. Wickham, Iowa City, Ia.; John Akhurst, Brooklyn; George E. Ashby, Brooklyn, and Col. Nicholas Pike, Brooklyn.

Mr. Neumoegen opened scientific discussion by reading descriptions and exhibiting specimens of *Parnassius smintheus*, var. *nanus*; *Arctia dieckii* n. sp., British Columbia; *Ira gundlachiana* n. sp. S. E. Cuba; *Sphingicampa bisecta*, var. *nebulosa*, n. var., and *Horama jalapensis* n. sp. of Mexico, and further exhibited ♂ and ♀ specimens of *Ornithoptera victoria* from the Solomon Isles, *Armandia thaitina* and *liddalii*, and other rare species of exotic Lepidoptera. Discussion by Messrs. Graef, Hulst and Smith.

Mr. Smith continued scientific discussion by presenting a proposed revision of the North American Agrotids based upon structural differences.

Discussion by Messrs. Graef, Hulst, Hooper, and Smith.

A. C. WEEKS, *Rec. Sec.*

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◆

ERRATA.

Page 32, No. 60, for *Brachysorata* read *Brachys ovata*.
" 40, top, for *Cylleus* read *Cyllene*.
" 54, for *Catocolæ* read *Catocalæ*.
" 174, line 14, for "fine black spots" read five etc.

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A MONTHLY JOURNAL OF ENTOMOLOGY.

PUBLISHED BY THE

Brooklyn Entomological Society

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NEW BRUNSWICK, N. J.

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FRANK H. CHITTENDEN,
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ENTOMOLOGICA AMERICANA.

VOL. VI. BROOKLYN, JANUARY, 1890. No. 1.

ANNUAL ADDRESS OF JAMES FLETCHER, PRESIDENT OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S. 1889.*

GENTLEMEN :—Another year has rolled by since we held our last pleasant meeting in the city of Cleveland. It is with much pleasure that I recognize here to-day the faces of several of those who helped to make that meeting so successful, and, as gratitude has been satirically described as "a keen appreciation of further favors to come," I feel grateful to such of you for being present at this meeting, the success of which, to a certain extent, your presence assures, but for which I, as presiding officer, shall be held largely responsible. With the help of our Secretary I have endeavored to arrange the papers to be read, so as to save as much time as possible, and at the same time to make the most of the papers. It is a time-honored custom that the President should give an address at the opening of the Annual Session, I therefore bow to the decree of fate, and shall endeavor for a short time to lay before you some subjects which it has occurred to me are worthy of consideration by the members of the Club. Inaugural addresses generally take the form either of a prospective or retrospective view of the matters with which the Society, before which they are delivered, particularly concerns itself, or on the other hand, they are devoted to the elaboration of some one special subject. I purpose following the former of these courses to-day, and shall briefly remind you of some of the most remarkable occurrences affecting entomologists, which have taken place during the period that has elapsed since we last met, and I shall also endeavor to direct your attention to one special matter connected with the future of the science, which, it seems to me, can be discussed to advantage during the present meeting.

---

* See Ento. Amer. v, p. 201.

When last year you conferred upon me, what I felt was the too great honor of electing me, the first Canadian, to fill the chair of the Entomological Club, I accepted that position as tendered to the President of the Entomological Society of Ontario in recognition of the good work that has been done by that Society, which I, on that occasion, together with Dr. Bethune, had the honor of representing as delegate.

The chief attacks by insects upon cultivated crops which have demanded the attention of entomologists during the past season, are the following : In all parts of Canada and the United States the noctuid larvæ known under the name of "Cutworms," were extremely abundant in the spring. In the maritime provinces of New Brunswick and Nova Scotia, as well as Quebec, the Tent Caterpillars did much injury to orchard and forest trees. In central Ontario *Meromyza americana* was unusually abundant, but it was also accompanied by its parasite, *Cœlinius meromyzæ*. Not only were certain kinds of wheat and barley severely attacked, but also a single instance of the attack on oats was observed, and I made the further unpleasant discovery that the species bred freely in various wild grasses, chiefly of the genera *Agropyrum*, *Deschampsia*, *Elymus* and *Poa*. Upon the experimental grass patches of the Experimental Farm at Ottawa, the species of *Agropyrum* and *Elymus*, and *Poa serotina* were the grasses most attacked, while only a single instance of injury to *Setaria viridis* was noticed. An interesting point was, that while *Poa serotina* was so severely injured, *Poa pratensis*, *Poa cæsia* and *Poa compressa* were almost exempt. The species of *Elymus* and *Deschampsia* were attacked in the young shoots close to the root, but the others mentioned in the top joint of the flowering stems, by which the appearance known as "Silvertop" was produced. The name "Silvertop" is also applied to the results of the ravages of *Phlæothrips poaphagus*, which is now becoming a "first-class pest" in many parts of Canada. The grasses which suffer most from this insect are, early in June, *Poa pratensis*, and later in the month, *Phleum pratense*. A much more serious matter, however, was a new injury to oats by a species of *Thrips*, which has been found to be undescribed. This insect attacks the flowers of oats just before they leave the sheath, in consequence of which they turn white and die.

An outbreak which may prove to be one of great importance is the appearance, during the past summer, in one of our Canadian towns, of large numbers of the European flour moth (*Ephestia kuhniella*). Radical measures have, however, been taken by the provincial government for its suppression, and I trust that it may be stamped out before it spreads to other centres of the milling industry.

In the United States the attacks of most interest were the following: The appearance, in very large numbers, of *Siphonophora avenæ* in Michigan, Ohio, Indiana and Illinois, drew forth many notices in the public press. Perhaps next in importance was the outbreak of an imported fly of the genus *Hæmotobia*, which has increased so as to become a serious pest to cattle. It has occurred in injurious numbers in Pennsylvania, New Jersey, Delaware, Maryland and Virginia. Its life history has been studied by the entomologists of Washington, and Prof. J. B. Smith, in New Jersey. The salient points are already discovered, and successful remedies have been made known. The Army Worm (*L. unipuncta*) has done restricted damage in Indiana, and has also occurred in Florida. Brood VIII of *Cicada septendecim* has appeared in Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Kentucky, Maryland, north Virginia and North Carolina. The Chinch-bug (*Blissus leucopterus*) has been abundant in Missouri during the past summer, and the Hop Aphis (*Phorodon humuli*) is reported as more abundant in New York this summer than it has been since 1886. *Attacus cecropia* has been remarkably abundant in the tree planted regions of the West and Northwestern States.

The Cotton Worm and Boll Worm have been very abundant and injurious in the cotton-fields of the South. Trees and shrubs of all kinds, both in the United States and Canada, have suffered much by the attacks of various leaf-hoppers. These attacks will doubtless all be dealt with by the United States entomologist, or the State entomologists in their reports, so I shall not now speak of them at greater length than I have done, but will beg you to give me your special attention while I speak to you upon a subject which appears to me to be, at the present time, one of very great importance. It has lately been brought prominently before the entomological world in the pages of "Insect Life." This is no less than the organization of the active, working, economic entomologists of North America into a permanent association or union, so that an opportunity may be afforded to those students who are specially engaged in the practical application of the science of meeting periodically to discuss new discoveries and to exchange experiences as to the best methods of work. The value of such an association cannot, I believe, be overestimated. The recognition which, during the past decade, has been accorded to Entomology as a branch of Practical Agriculture, makes it important that as little time as possible should be wasted upon unnecessary reduplication of experiments, and also on the other hand that successful methods of combating injurious insects should be made known as widely and quickly as possible.

A small number of the States of the Union had employed their State entomologists for some years past, and Canada her's since 1884. All of these officers had striven hard to do good and useful work in the vast field which lay before them. Recently, however, a great impulse has been given to practical science in all lines by the very important "Hatch Experiment Station Act," which was passed by Congress in 1888. This Act provides that a sum of $15,000 should be annually set aside for the purpose of carrying on scientific agricultural experiments in every State of the Union. In consequence of this Act there have already been organized Experimental Stations, twenty-seven of which have entomologists on their staffs, and these officers have already issued much valuable practical information in the shape of bulletins to the farmers of their respective States. The operation of injurious insects are such an important factor in the success or failure of all crops grown, and the recognition of that fact is now becoming so wide-spread amongst the educated agricultural classes, that before long it is beyond question that the directors of the other Stations will see the advisability of adding an entomologist to their staff. The result of this will be that we shall have in North America a large number of men specially trained for the work they have undertaken, with sufficient time and means at their disposal for carrying out any experiments which may be necessary. Surely, under such circumstances important results must follow. They all have the same object in view—the discovery, as soon as possible, of practical—that is, efficient, simple and cheap—remedies for the various injurious insects which destroy produce. The work of all these students will, of course, have to be carried on independently, in widely separated localities, and a fact which will give special value to their labors will be, that similar experiments will be carried out carefully and scientifically under differing circumstances and with varying climatic conditions.

Such an opportunity for showing the value of Science has never before occurred, and it is incumbent upon the men who accept these positions to recognize also the responsibility of their offices. I would suggest that not only is extreme care necessary in the carrying out of our experiments as official entomologists, but also great thought must be given to the best means of publishing and making known results. Above all things is it necessary to gain the confidence of those for whom we write. The editors of agricultural papers are frequently enquiring for articles upon Economic Entomology, but they always say they *must* be simply expressed, or they are useless to them because their readers will not read them. Even amongst highly educated, and even cultivated people, you find many to whom the very word "science" is a bug-bear, and much more is this the case with the large class of agriculturists. A class which, although it does contain many men of education and culture, of course consists mainly of men who have not had the time nor opportunity to avail themselves of educational advantages. They are, however, as a class, men who spend their lives away from the distractions, largely frivolous, of city life, and, as a consequence, develop a faculty for observation, thought and practical application, which would indeed be a boon to many an aspirant to scientific fame. Writings upon agricultural entomology should be, I think, couched in the simplest language possible; the articles should be short and concise, without too much detail of the life-history of the insects discussed. Prominence should be given to the nature of the attack, so that it may be recognized; the essential points of the life-history of the insect, so that its habits may be understood and missing links filled in; and above all the best remedy, under existing local circumstance; and lastly a statement of such information with regard to the pest as may be lacking.

During a somewhat extensive intercourse with farmers I have always found them anxious to learn anything about injurious insects and the means of combating them. As a general thing they are willing to devote both time and labor to any experiments suggested if there is only a chance of success, but they complain that frequently writings which are professedly written expressly for them are unintelligible, that there is too much detail concerning the life-history, or that even under remedies there is frequently a long string given without comment, some of which are good and some useless. Now this is, to a certain extent, true, and is due, I think, to two causes—either, as stated in "Insect Life," that "Economic Entomology has heretofore greatly suffered by the writings and pretensions of those who have no sort of appreciation of its real value and importance, but who, writing at second-hand upon subjects of which they have no personal knowledge whatever, are just as apt to disseminate error as truth," or perhaps to the fact that some entomologists have tried to cover too much ground, and while professedly writing articles for the good of a class which it is assumed has no knowledge of scientific terms; at the same time they endeavor to maintain their scientific status and secure the credit of priority in description or discovery. I would venture the opinion that it is impossible to combine these two causes advantageously, and that the scientific details and necessary descriptions and discussion of theories would find a more appropriate place in the scientific periodicals and transactions of societies devoted to the subject, whilst the results, the practical application of our work for the good of the country should be published where, and in the manner, it can do most good. It will be seen in this way that I give the highest place of honor to Economic Entomology, and this I really believe to be a proper arrangement. The systematic classification of orders and genera, and the arrangement of large collections so as to understand the proper relationships which exist, are matters of engrossing interest, but the intelligent application of this knowledge for the benefit of mankind at large, draws such vast consequences in its wake that it demands the closest attention of entomologists. So great, however, is the field of Entomology that it cannot possibly be covered by any one individual, and the work of specialists in every department is necessary. Owing to the institution of the various Experiment Stations in the United States with their several entomologists, doubtless the attention of many will now be turned to Entomology who otherwise would not have thought of it, and also so many men entering enthusiastically upon the field at the same time to do original work will certainly have the effect before long of producing eminent and useful public officers. I therefore make a special appeal to you to consider now whether a union which would be the means of bringing together at least once a year all those working specially in Economic Entomology would not be a useful institution. Some of the official entomologists have been well trained in Economic Entomology, whilst others are young men fresh from college, and with only a general knowledge of the subject. To these latter, of course, by far the greatest advantage would accrue; there is such an infinity of small things and so many doubts, which a word from one of greater experience can settle, that the meeting once a year where questions of economic interest alone would be discussed, would be, I believe, an inestimable boon to all of us. And from the favor with which this suggestion has been received by many of the fathers of Economic Entomology, I believe that even they would reap sufficient benefit from the experience of others to well repay them for any time they might devote these meetings for the encouragement of others and for the good of the cause. Without going into too great detail I will mention one or two of the advantages which have occurred to me in connection with such an organization. First of all it will give opportunities for a large body of earnest workers in the same field and with the same interests, to become acquainted with each other, and this I consider a point of great importance. I regret to say that it cannot be denied that there is sometimes evidence of unkindly feeling towards fellow students in scientific writing. The social intercourse which would be engendered by the union would do much to put an end to this. Many small matters which might offend or hurt, can be overlooked, or as we say, "understood" when we know the man from whom they emanate, and I presume my experience of life cannot have been very widely different from that of other people when I have found far more to like than to dislike in everyone when you come to know them. Well, this union will allow us to know each other. It will give us an opportunity for systematic work. Problems frequently arise of paramount importance. By this means it will be possible to delegate certain parts of any special investigation to such students as may have special opportunities therefor.

Above all, the union will be an advisory board either for discussing matters of great interest to ourselves or for the advice of the legislature upon occasion of any serious invasion or threatened visitation by insect enemies; thus while we are united we shall do far better scientific work; we shall uphold better the dignity of our offices; we shall gain the confidence of the public, and of the government, and we shall be bound together in a solid union for our own good and that of the country at large.

Although I have taken the liberty of bringing this matter before you now, and ask you to express an opinion upon it at once, as you are all aware it is no new idea sprung upon the meeting unawares. As I have mentioned, notices have appeared in "Insect Life" suggesting the matter, and I have myself distributed, to every one who I thought would be interested, a circular notifying them that I proposed bringing the matter up for discussion.

The movement seems to have originated with the very eminent United States Entomologist, Prof. C. V. Riley, who has done so much by his writings and successful experiments to raise Economic Entomology to the honorable position it now enjoys in the appreciation of intelligent people of all classes.

And now gentlemen allow me to thank you for the great honor you conferred upon me when you elected me to preside over you during the past year and at this meeting. I hope, sincerely, that the Entomological Club of the American Association may continue to prosper and be the means of bringing us all together at least once a year, like the members of a large and attached, but widely scattered family who rejoice when, on such festivals as Christmas, New Year, or Thanksgiving Days, an excuse or opportunity is given for a social reunion, where we may discuss with each other in a friendly manner matters of general interest. I trust that during the present meeting the deliberations may be carried on in the same spirit of kindness and forbearance which have always characterized previous meetings, and in conclusion I hope that we all may long be spared to meet annually and derive from each other the benefits of scientific discussion and enjoy the social pleasures of mutual intercourse.

JAMES FLETCHER.

LARVÆ OF SEIRARCTIA ECHO.

BY ANNIE TRUMBULL SLOSSON.

I have received the following very interesting letter from Mr. A. J. Brink, of Ormond, Fla. Mr. Brink is an intelligent and reliable observer, and what he writes seems to confirm the statements made to me by many persons concerning the larvæ of *S. echo* and their habit of invariably travelling in a northerly direction :

"During the last week in April I saw quite a novel sight. I was driving on the beach with a friend when, about six miles from Ormond, we saw in the distance a dark line drawn from the bluff to the water's edge. Beyond it, as far as the eye could distinguish, the beach was covered with some dark substance. Upon approaching it we discovered that the sand was literally alive with the larvæ of the Echo moth. What seemed to us very peculiar was the well-defined line running at right angles to the bluff and reaching to the water. Between us and that line not a caterpillar was to be seen, while beyond it were countless thousands hurrying along in the same direction toward some unknown destination. The beach at this point is about three hundred feet wide, and for more than two miles we drove through them. I know I do not exaggerate when I say that there were at least six caterpillars in every square foot for the entire distance. Leaving my team I climbed the ridge to learn, if possible, why they were thus congregating on a spot so entirely devoid of vegetation. I saw at once that their well known habit of travelling in a northerly direction was getting them into trouble. The beach at this point bears considerably west of north, and the caterpillars on reaching the edge of the bluff would roll down to the beach, from whence it was impossible to return. Even here they turned neither to the right or left, but persistently crawled on to the water's edge, where each receding wave would carry out dozens, only to bring them back dead and pile them up in ridges on the beach. In places these ridges of dead caterpillars would be fully four inches high. After driving two miles or more we found the beach suddenly clear of them, the line here being as well defined as on the south side, where we first approached them. While watching them I went inland seventy-five feet or more into the palmetto scrub. Here they were not nearly as thick, but there were a great many on the ground, and all travelling in the same direction."

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 44, vol. iii)

AGALLISSINI.

The characters of this tribe are stated in Bull. Br. Ent. Soc. vii, p. 114, and are fully discussed in the "Classification" p. 306. It contains only two species, both very rare in collections, viz. :

Agallissus gratus Lec.
Length 19 mm. = .75 inches. *Habitat.*—Texas.

Shining black, sparsely punctured, with the elytra narrowed behind, truncate and finely serrate at tip, ornamented with yellow spots, of which the basal pair are elongate. Front quadrate, oblique ; prothorax rounded on the sides ; sutural spine of elytra moderately prominent. Antennæ slender, shorter than the body in both sexes.

Zagymnus clerinus Lec., S. M. C. No. 264, p. 203.
Length 13 mm. = .52 inches. *Habitat.*—Florida.

Opaque black, very coarsely and deeply punctured with the elytra parallel on the sides, rounded at tip, with a round basal spot and two broad transverse scarlet bands, interrupted at suture and connected at margin ; sutural spine small. Front short, vertical ; prothorax longer than wide. Antennæ like preceding. A specimen in the collection of Mr. Ulke is entirely black.

ATIMIINI.

Atimia confusa Say, J. A. P. v, 2, 1827, p. 276 ; Hald., Proc. Ac. Phil. iv, p. 373 ; Lec., J. A. P. ser. 2, ii, 1850, p. 25 ; *tristis* Hald., Trans. Am. Phil. x, p. 56.

Length 10 mm. = .40 inches. *Habitat.*—Texas.

A. dorsalis Lec., Ann. Nat. Hist. iv, 1869, p. 385.

Length 10 mm. = .40 inches. *Habitat.*—Vancouver, So. Cala.

Both are short, stout insects, resembling a rather stout Lamiine. The body is densely clothed with long, coarse, luteous hair, with some denuded spots on the thorax and elytra ; the former is quadrate transvere, scarcely rounded on the sides and coarsely punctured; the latter a little broader, truncate at tip, more faintly and very sparsely punctured, with several rows of very distant larger punctures. "*A. dorsalis* is closely related to *R. confusa*, but differs by "the prothorax being less transverse, almost quadrate and scarcely "rounded at sides, except near apex, where it is suddenly narrowed. "The arrangement of the denuded spots is somewhat similar, but "the sides of the thoracic vitta are straight and the elytral spots are "confluent, forming a vitta extending nearly to the tip with two external dilations" (Lec. l. c.)

LEPTUROIDES.

The fourth and last division of the Cerambycinæ is characterized and divided as follows :

Base of antennæ not enveloped by the eyes, which are entire or emarginate, and usually finely granulate ; front coxæ conical (except in Distenia); stridulating plate of mesonotum divided by a smooth space or furrow.
  Mandibles scalpriform, not fringed . . . . **Disteniini.**
  Mandibles simple, not fringed . . . . **Desmocerini.**
  Mandibles acute, fringed on the inner margin.
    Elytra abbreviated . . . . **Necydalini.**
    Elytra not abbreviated.
      Front nearly vertical . . . . **Encyclopini.**
      Front oblique, or horizontal . . . . **Lepturini.**

DISTENIINI.

Distenia undata Oliv., Ent. iv, 69, p. 25, t. 2, fig. 15; Buquet, Mag. Zool. 1843, t. 118, fig. 7; Lec., J. A. P. ser. 2, ii, 1850, p. 37; Lacord., Gen. Atl. x, t. 95, fig. 1.

Length 17—25 mm. = .70—1.00 inches. *Habitat.*—Eastern U. S.

Very elongate, brown, clothed with dense gray pubescence; head large, horizontal; antennæ about as long as the body; mandibles thick, curved, chisel shaped at tip, apical edge vertical, sharp, straight; prothorax with dorsal elevations and acute lateral spine; elytra gradually narrowed, bispinose at tip, bearing two distinct discal costæ and a sutural and marginal costa fainter; punctures between large and distinct. The elytral pubescence is partly denuded, leaving a basal blotch and two angulate bands brown.

DESMOCERINI.

Four species of *Desmocerus* form this tribe, and the following synopsis has been published by Dr. Horn, Trans. Am. Ent. Soc. ix, 1881.

Elytra with basal half yellow, apex blue, disc faintly tricostate . . **palliatus.**
Elytra either entirely yellow, or margined with yellow, not costate.
  Male elytra orange-yellow, female with discal blue space; punctuation moderately coarse, a little finer near apex . . . . . . **auripennis.**
  Elytra similarly colored in the sexes, both narrowly margined with yellow at sides and base.
    Thorax irregularly plicate; elytra coarsely and deeply punctured from base to apex . . . . **cribripennis.**
    Thorax densely punctured, regularly convex; elytra moderately coarsely punctured at base, more finely and densely at apex . . **californicus.**

D. palliatus Forst., Nov. Spec. Ins. 1771, p. 40; Lec., J. A. P. ser. 2, i, p. 318; Harris, Ins. Mass. p. 92; *blandus* Fab., Syst. Ent. p. 182; *cyaneus* Fab., Syst. Ent. App. 1775, p. 823; *elongatus* Bland., Proc. Ent. Soc. Phil. i, 1862, p. 269.
Length 17—23 mm. = .70—.90 inches. *Hab.*—La., N. C., N. Y. Ct, Va. Pa.

D. auripennis Chev., Rev. Zool. 1855, p. 187; Ann. Fr. 1858, p. 325, t. 8, f. 6.
Length 22 mm. = .88 inches; ♂ ♀. *Habitat.*—Cala., Nev.

D. cribripennis Horn, Trans., Am. Ent. Soc. ix, 1881, p. 7.
Length 16 mm. ♂, 20 mm. ♀ = .64—.80 inches. *Hab.*—So. Cala., Wash.

D. californicus Horn, l. c.
Length 12 mm. ♂, 18 mm. ♀ = .48—.92 inches. *Habitat.*—California.

NECYDALINI.

This tribe contains four species in two genera, all of considerable size and conspicuous among the Longhorns by the abbreviated elytra, which are scarcely longer than the thorax, dehiscent and separately rounded at tip. They may be separated as follows:

Last joint of palpi oval; third and fourth antennal joints together not longer than the fifth . . . . **Ulochætes leoninus.**

Last joint of palpi bell shaped; third and fourth antennal joints together distinctly longer than fifth . . . . **Necydalis.**

Elytra obliquely impressed only . . . . **N. mellitus.**

Elytra obliquely impressed and also transversely near tip.

Antennæ more slender, fourth joint longer . . . . **N. lævicollis.**

Antennæ stouter, fourth joint shorter . . . . **N. cavipennis.**

The fourth antennal joint in *cavipennis* ♂ is scarcely more than half as long as the third. In the ♀ it is not so conspicuously short, but still much shorter than in *lævicollis*.

U. leoninus Lec., Proc. Ac. Phil. vii, p. 82; Ent. Rept. 1857, p. 62, t. 2, f. 12.
Length 25 mm. = 1.00 inches. *Habitat.*—Oregon, Nevada.

The short elytra and great size will quickly distinguish this remarkable species. It is very robust and hairy, and seems to be rare in collections.

N. mellitus Say, Bost. Journ. i, 1835, p. 194; *americana* ♀ Hald., Trans. Am. Phil. x, p. 44; Proc. Ac. Phil. iv, p. 372.
Length 15—21 mm. = .60—84 inches. *Hab.*—Ind., Pa.

Color variable, usually rufotestaceous, head, antennæ (base and tip tinged with rufous), thorax, scutellum and abdomen above black; elytra punctate, more coarsely towards the margin; reddish brown with paler spot at tip, or entirely rufotestaceous. The oblique impression is not deep, and does not reach the tip.

N. lævicollis Lec., Ann. Nat. Hist. iv, 1869, p. 383.
Length 16 mm. = .64 inches. *Hab.*—Nevada, Vanc.

Color variable, rufous or piceous. The form is more robust than the preceding, and the elytra are roughly punctured with a strongly marked impression near the suture and slightly oblique. Near the tip is a sharply defined transverse impression, behind which the tip is obliquely elevated.

N. cavipennis Lec., S. M. C. No. 264, p. 204.
Length 18—22 mm. = .72—.88 mm. *Hab.*—Cala.

Color is variable as in the preceding, which it strongly resembles. It is, however, stouter, and besides the differences in antennæ stated in above table, the elytra are impressed nearer the tip, which is more suddenly concave.

ENCYCLOPINI.

This tribe contains three genera, each represented by a single species. The generic characters briefly are:

Tarsi wider, joints 1—3 brushlike beneath . . . . **Pyrotrichus.**
Tarsi slender, first joint very long.
  Hind tarsi with basal joint sulcate, brushlike at sides . . . . . **Leptalia.**
  Hind tarsi with basal joint cylindrical, not brushlike . . . . **Encyclops.**

P. vitticollis Lec., J. A. P. 1862, p. 41.
Length 12 mm. = .48 inches. *Hab.*—Cala.

Black, opaque; with head, scutellum and three thoracic vittæ broadly fulvo-pubescent; elytra coarsely punctured, margin behind and at apex reflexed, tip feebly truncate. In each of the elytral punctures is contained a very minute brown hair.

L. macilenta Mann., Bull. Mosc. 1853, iii, p. 253; Lacord., Gen. Col. 1869, p. 446.
Length 8 mm. = .32 inches. *Hab.*—Alaska.

Black, densely punctured; prothorax narrower than the head, deeply constricted before and behind, the sides obtusely, but strongly dilated; elytra elongate, parallel, feebly truncate at tip. Antennæ long and slender as in Encyclops, to which this insect is closely allied. The elytra are sometimes yellow, with suture and broad sublateral vitta black.

Var. **frankenhauseri** Mann., l. c.

The elytra are yellow, with one black vitta only, and the legs are testaceous.

Var. **fuscicollis** Lec., Ent. Rept. 1857, p. 65; Ann. Nat. Hist. iv, 1869, p. 383.
Length 10 mm. = .40 inches. *Hab.*—Or., Vanc., Cala.

The elytral vitta is very indistinct, and the body is testaceous. The legs are testaceous, sometimes varied with black.

E. cœruleus Say, J. A. P. v, 2, 1827, p. 280; Lec., J. A. P. ser. 2, i, 1850, p. 317; *pallipes* Newm., Ent. Mag. v, p. 392.
Length 7—8 mm. = .28—.32 inches. *Hab.*—Can., Ct., L. Sup., N. Ill., N. Y.

Very elongate and slender, green or blue, shining and coarsely punctured; legs and antennæ very slender, testaceous; thorax narrower than head, tuberculate at sides; elytra parallel, sparsely rounded at tip.

(To be continued.)

A New Orthopter from Tennessee.

BY DR. F. W. GODING.

Stetheophyma doranii n. sp. Vertex swollen at border of eyes; no medial ridge extending over top of head as in *lineata*, but top flattened, slightly sulcate; foveolæ medium, shallow, triangular. Pronotum finely punctured;

lateral carinæ divergent, subdistinct on anterior half, somewhat prominent on posterior half, not broken. Elytra long, narrow, strongly swollen, curve 5 mm. from base, on costal border. Color dark brown, spotted with ochreous; markings of head and pronotum as in *gracilis*. Ochreous along costal edge for about half the length, remainder and dot or swollen curve, black; no such broad band as in *lineata;* three interrupted ochreous bands pass from costa over suture to costa; dirty yellowish stripe along each lateral angle from base of elytra nearly to apex of abdomen; apex translucent, dusky. Basal two-thirds of wings bright lemon-yellow, fuliginous band passing over outer third, apex translucent, fuscous. Front and middle legs dirty ochreous; hind femora ochreous, apex black, basal half of inner side shining fuscous with spot of same color between it and apex; swollen and flattened at base. Hind tibiæ brownish olive, with band of yellow near base; tips of spines black. Hind tarsi and spurs of tibiæ piceous. Length to apex of elytra 28 mm.; elytra 19 mm.; hind femora 12 mm. (type in F. W. G. coll.)

Habitat.—East Tennessee.

Described from one female named in honor of Prof. E. W. Doran, State Entomologist of Tennessee, who kindly furnished the specimen.

Preparatory Stages of Plusia Californica.

BY HARRISON G. DYAR.

Egg.—Hemispherical rounded at the base, the apex with a rounded depression. Finely creased vertically. Color pale yellow.

First larval stage.—Head somewhat cordate, black and shiny. Cervical spot and thoracic legs faintly blackish. Body pale yellow, with black hairs. The larva eat the under part of the leaf and rest on the abdominal legs with the body bent up in a closed loop, the head touching the leaf. They walk like a geometer, as the last three pairs of legs only are present. Duration of this stage three days.

Second larval stage.—Head whitish. Body green, with a transverse row of black spots per segment bearing black hairs. A subdorsal and a stigmatal whitish line. Joint 12 is enlarged, as in many noctuid larvæ.

Third larval stage.—Head greenish, with minute black dots and black hairs; jaws reddish. Body green, with white piliferous dots having black centres. On joints 5, 6 and 7 is a distinct black spot in the subdorsal space. A narrow subdorsal and broader stigmatal white line, the former supplemented by two indistinct longitudinal white streaks. Body furnished with a few black hairs. Length about 7 mm.

Duration of this stage three days.

Fourth larval stage.—Head green, with minute brown speckles and a few black hairs; eyes, jaws and palpi brown. Body green, a broad white stigmatal line, a narrow subdorsal one and two more in the subdorsal space also white. The upper of these lines is somewhat wavy and interrupted, and the lower one is broader than the subdorsal line. On each joint two rows of white dots with black centres bearing short black hairs. The spots alternate on the middle joints. Thoracic feet tinged with blackish, the abdominal concolorous with the body. Length about 12 mm.

Duration three days. During this stage and subsequently the larva eat the whole leaf instead of the lower portion as previously. If disturbed, the insect curls spirally and falls to the ground with contortions.

Fifth larval stage—Mature larva, Head shiny green, jaws brown, palpi black. In some examples there is a black stripe on the head. Body dark green, the lines as in the previous stage, the stigmatal ending sharply above, but blended ventrally.

The elevated spots bearing white hairs are whitish, except the suprastigmal ones, which still have black centres. Cervical spot and anal plates dull pale green. The stigmatal space and venter have some minute white spots, and on each joint from 5 to 10 inclusive, there is a small black dorsal spot situated anteriorly. Spiracles white in a black oval. Thoracic feet blackish; joint 12 is slightly enlarged and joint 13 is small. The abdominal legs throughout its history, consists of only three pair on joints 9, 10 and 13, and the larva walks like a geometer. Length 25 mm.

Duration of this stage four days.

The insect spins a thin web of white silk in which to pupate, drawing together any loose objects to assist in covering it, and this operation, together with the preparation for pupation, occupies two days.

Pupa.—Depressed somewhat above the wing cases at back of the thorax, the eyes prominent, the tongue case projecting below the wing cases, forming a round prominence over the first abdominal segment. The cremaster is short and blunt, and the hooks with which it is furnished, are fastened in the silk of the cocoon. Wing cases slightly creased. Color brownish black, but paler at the joinings of the parts and between the abdominal joints. In occasional instances the whole pupa is pale.

Duration of this stage twelve days.

Food-Plant.—Malva. Larvæ from Los Angeles County, Cala.

For the determination of this species I am indebted to the kindness of Prof. John B. Smith.

FOOD-PLANTS OF LEPIDOPTERA No. 13.

(HALISIDOTA CARYÆ, *Harr.*)

BY WM. BEUTENMÜLLER.

TILIACEÆ.

Tilia Americana, L. (Basswood).
" Europea (European Linden).
" alba, Michx. (White Linden).

SAPINDACEÆ.

Acer dasycarpum, Chr. (Silver Maple).
" rubrum, L. (Red Maple).
" pseudoplatanus, L.
Negundo aceroides, Moench. (Box Elder).

ROSACEÆ.

Prunus serotina, Ehr. (Wild black cherry).
" Virginiana, L. (choke cherry).
Pyrus malus, Tourn. (apple).

HAMAMELACEÆ.

Hamamelis Virginica, L. (Witch-hazel).

OLEACEÆ.

Fraxinus Americana, L. (White Ash).

URTICACEÆ.

Ulmus Americana, L. (American Elm).
" fulva, Michx. (Slippery Elm).
" campestris, L. (English Field Elm).
Celtis occidentalis, L. (Hackberry).

PLATANACEÆ.

Platanus occidentalis, L. (Sycamore).
" orientalis, L. (Oriental Plane).

CUPULIFERA.

Quercus alba, L. (White Oak).
" rubra (Red Oak).
" palustris, Du Roi (Pin Oak).
Castania vesca, L. (Chestnut).
Fagus ferruginéa, Ait (America Beech).
Carpinus Americana, Michx. (Hornbeam).

BETULACEÆ.

Betula alba, L. (White Birch).
" populifolia, Spach.
" papyrifera, Marsh. (Paper Birch).
Alnus serrulata, Willd. (Black Alder).

JUGLANDACEÆ.

Juglans nigra, L. (Black Walnut).
" cinerea, L. (Butternut).
Carya alba, Nutt. (Shell-bark Hickory).
" tomentosa, Nutt. (Bull nut).
" porcina, Nutt. (Pig nut).

NOTES AND NEWS.

A supplement to the "Catalogue of the Coleoptera common to North America, northern Asia and Europe is in course of preparation. Information of the capture in North America of the following species and other cosmopolites is greatly desired, and those having any of them in their collections will receive due credit if they communicate them to the undersigned before long; few of them have even a name in our literature, and it will be of value to science to place the fact on record if any of them exist in American collections:

Falagria longipes (*fovea*, *currax*), Thectura (*Dinarea*) angustula, Phlæopora latens (*major*), Homolota cavifrons, H. picipes (*parva*), H. coriaria, H. divisa, H. palustris, H. aquatica, H. ovaria, H. graminicola, H. sulcifrons (*pavens*), Aleochara puberula (*vaga*, *dubia*), A. morion, A. verna (*binotata*), Microglossa suturalis (*prætextata*), Sipalia hæmorrhoidalis Heer (*fumida*), Placusa complanata Er., Oligota pumilio (*pedalis*), O. pusillima, Gyrophæna strictula, Baptolinus longiceps, Xantholinus punctulatus, Medon debilicornis (*asteria*, *effluens*), Hypociptus læviusculus, Mycetoporus punctus, M. punctipennis, M. brunneus, Bledius opacus, Oxytelus laqueatus (*luteipennis*), Trogophlœus bilineatus, T. fuliginosus, T. gracilis (*tenellus*), Acidota quadrum, var. alpinum, A. brachypterum, Homalium cæsum, Scymnus arcuatus, Læmophlœus fractipennis, Cryptophagus scutangulus, C. affinis, Atomaria apicalis, Dermestes peruvianus (*hæmorrhoidalis*), Lathridius transversus, L. (Melanopthalma) gibbosa, Corticaria fulva, Ostoma (*Peltis*) grossum, O. oblongulum, Lophocoteres (gen. of Trogosit.) pusillus, Lyctus brunneus Tribolium confusum. All Rhyncophoræ not in the Catalogue.

John Hamilton, 18 Ohio St., Allegheny, Pa.

We are to have a new entomological journal, to be published under the auspices of the Entomological Section of the Academy of Natural Sciences of Philadelphia, and the American Entomological Society.

It is to be called "Entomological News," and to cost one dollar per annum, for ten numbers of sixteen pages each.

The editor is Mr. Eugene M. Aaron; the advisory committee: George H. Horn, M.D., E. T. Cresson, Henry Skinner, M.D. and Philip P. Calvert.

There is room for a journal to cover the field proposed to be covered by this paper, and if it is as well done as it ought to be by the gentlemen above named, it will be indispensible for every working entomologist.

Bibliographical Catalogue of the described transformations of North American Lepidoptera by Henry Edwards. Bulletin No. 35 of the U. S. National Museum.

No more generally useful, and to the Lepidopterist indispensible work, has been issued for some time. It is a valuable guide to those who breed insects, for it enables them to see what has been done, and to fill up omissions. It ought to prevent the continual redescription of species described in all stages *ad nauseum*, while some of the many species that I know have been bred should now be published.

According to this list a grand total of 1069 species are known in some of the early stages. Of these the *Rhopalocera* have 180 species, the *Sphingidæ* 55; *Sesiidæ*, 16; *Zygænidæ* (*!!!*), 13; *Bombyces*, 178; *Noctuidæ*, 188; *Geometridæ*, 101; *Pyralidæ*, 39; *Tortricidæ*, 61; *Tineidæ*, 222; *Pterophoridæ*, 16.

Mr. Edwards deserves the thanks of all Lepidopterists for this painstaking and extremely useful work.

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New Species of Mexican Lepidoptera.

BY WM. SCHAUS, JR.

ERYCINIDÆ.

Subfamily Erycininæ.

Caria melicerta n. sp. Above deep brown, with a slightly lilacine bloom on the wings; several indistinct wavy transverse bands of a darker shade of brown. The outer margins reddish brown divided by a steel gray line; a submarginal dark line outwardly bordered on the secondaries by a metallic green streak, and about the center of the costal margin of the primaries is a cluster of metallic green scales. Underneath reddish brown, darker at the apex of the primaries, spotted with black. Along the costal margin of the primaries a series of metallic gray spots, a marginal line of the same character on the primaries, and a marginal and submarginal row of similar spots on the secondaries. The ♀ differs above in being paler, having the transverse bands more distinct and broken into a series of spots. Underneath the wings are yellowish brown and all the spots are metallic gray, in some instances faintly outlined with black. Expands 23—25 mm.; 8 ♂♂ 2 ♀♀.

Paso de San Juan.

This species is near *Caria ino*, Godman & Salvin.

Lasaia sessilis n. sp. Primaries above dark lustrous gray crossed by irregular black lines, a marginal row of dark spots and a submarginal dark wavy band. Underneath paler with the transverse lines broken up into spots, the marginal spots very small and the submarginal wavy band decidedly indistinct, especially on the primaries. Expands 28 mm.; 4 ♂♂.

Coatepec.

Theope eupolis n. sp. Primaries above black, with a small patch of blue at the base of the inner margin, and hardly extending above the median vein. Secondaries blue, with the costal margin, and the apical half of the outer margin broadly black. Underneath light brown with, at the anal angle, two or three indistinct black spots edged inwardly with light blue. Expanse 30—35 mm.; 2 ♂♂ 3 ♀♀.

Paso de San Juan.

This species comes very close to *Theope virgelius* Fabr., but is easily recognized by the smaller extent of blue on the primaries and the black margin to the secondaries.

Theope bacenis n. sp. Primaries above bleck, with a large bright blue space at the base along the inner margin. This color does not extend above the subcostal vein, nor beyond the cell. At the end of the cell is a band. Secondaries, which are rather produced at the anal angle, bright blue. The costal margin black. Underneath brown, yellowish at the base of the primaries, the wings being crossed from the apex of the primaries to the center of the anal margin by a dark brown band. Expands 33 mm.; 1 ♂.

Coatepec.

SPHINGIDÆ.

Subfamily MACROGLOSSINÆ.

Enyo tædium n. sp. The male closely allied to the male of *Enyo gorgon*, having the same general aspect and peculiar fold of the cell as in that species. The costal margin is, however, straighter, the wings are not so long, and the body is also shorter and less tapering than in *Enyo gorgon*. Primaries reddish brown crossed by numerous wavy bands of a deeper brown. The apical portion of the wing is rather darker, except a lighter space situate along the center of the outer margin and inwardly curved. On the costal margin close to the apex is a small dark brown triangular spot. Secondaries reddish brown, darkest at their base and with a central and submarginal wavy brown line. Underneath reddish brown, gray along the outer margin of the primaries with two wavy brown lines crossing the wings beyond the cells. Head reddish brown. Thorax brown, with a darker shade crossing the patagiæ.

Abdomen brown, with dorsal tufts of curly scales and a dark brown spot on the anal segment; the anal lateral tufts also darker brown. Expanse 57 mm.; 2 ♂♂.

Jalapa, Coatepec.

Enyo riscus n. sp. Primaries above brown with a purplish gloss, crossed by several wavy brown lines from the costal to the inner margins. A conspicuous dark curved line extends from the apex to the internal angle, enclosing the outer marginal space, which is of a darker purplish brown than the rest of the wing. Secondaries purplish brown with the base, the inner margin narrowly, and the costal margin broadly yellow, the dark portion of the wing being crossed by a few wavy brown lines. Underneath wings yellow, thickly speckled with brown scales, the outer margins of the primaries with the same markings as on the upper side, but not so dark, and between this space and the cell three wavy brown lines cross the wing from the costal margin to the inner margin. On the secondaries the outer margin is broadly bordered with purplish brown and the wing is also crossed by two distinct wavy brown lines from the costal margin to the anal angle. Head, thorax and abdomen purple brown above, with a dark subdorsal line. Underneath yellowish, speckled with brown. Expanse 53 mm.; 1 ♂.

Rinconada.

Calliomma germen n. sp. Primaries above dark olivaceous gray, with an indistinct inner and an outer transverse wavy band of a darker shade. A marginal row of small dark spots, beyond which the wing is thickly speckled with blackish scales. Fringe brown. Secondaries brownish black; fringe alternately brown and white. Underneath light greenish gray, the wings thickly speckled with short dark streaks, except the basal half of the primaries, which is clothed with long dark brown scales. Head and thorax greenish; a white line behind the eyes. Abdomen brownish gray above, whitish underneath. Expanse 62 mm.; 1 ♂.

Coatepec.

Pergesa mexicana n. sp. Primaries above olive-brown, paler along the outer margin; an indistinct inner curved band from the costal margin to the base of the submedian vein; also three outer contiguous transverse wavy bands of a slightly darker shade, and beyond these a marginal row of small spots, about the center of which is a cluster of black scales, and the outer margin is speckled with short black streaks. Fringe brown. Secondaries brown; fringe brown, whitish at the anal angle. Underneath greenish brown, speckled with black, lighter than the upper side, except the base and central portion of the primaries, which are dark olivaceous brown. On both primaries and secondaries a conspicuous marginal row of small black spots. Head and thorax olive-brown with a pinkish streak extending from the antennæ along the sides of the thorax. Abdomen above olive-brown, underneath pink. Expanse ♂ 55 mm.; ♀ 70 mm. 3 ♂♂ 1 ♀.

Paso de San Juan.

(To be continued.)

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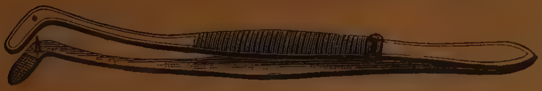

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ENTOMOLOGICA AMERICANA

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NEW CYNIPIDÆ.

BY C. P. GILLETTE.

ON BUR-OAK (*Quercus macrocarpa*).

Neuroterus flavipes n. sp. Gall.—A hard woody swelling of the mid-rib or one of the main veins of a leaf, the leaf becoming much wrinkled and deformed as the result. Large galls measure three-fourths of an inch in length and one-fourth of an inch in width. The flies usually escape from the upper surface, sometimes through a slightly raised teat-like projection.

Galls were gathered at Ames, Iowa, July 6, 1888, from which the flies had already begun to issue.

Gall-fly—Female.—Head, thorax and abdomen black; antennæ and legs light yellow; length 1.6 mm.

Head entirely black, face very sparsely set with short gray hairs and finely rugose; vertex, genæ and occiput finely rugose. Antennæ 13-jointed, first two joints stout, and nearly equal in length, third joint longest, fourth to thirteenth subequal in length, last six or seven joints forming a slight club; color light yellow. Thorax black, finely rugose, densely pitted on the shoulders, and very thinly set with short gray pubescence. Two shining, black, parallel lines, begin at the collar and run back about half way to the scutellum. Parapsidal grooves shallow, and can be traced about two-thirds of the way from the scutellum to the collar. Outside of each parapsidal groove is a short depressed line beginning near the base of the scutellum and running parallel with the groove past the base of the wing. Scutellum entirely black, densely pitted, and with two shallow foveæ that are almost obsolete. Legs light yellow, with the thighs and tibiæ dark, sometimes almost black; base of coxæ and pulvilli black. Abdomen black, polished, and with very few hairs. Ovipositor sheaths protruding. Wings hyaline; veins rather slender and light yellow in color, areolet wanting, cubitus and anal vein almost obsolete, and the radial nervure not reaching the costal margin. The anterior wings are without a fringe of hairs upon their borders and the hairs upon the surface of the wings are not well developed, but appear in most cases as minute specks. Described from thirteen reared specimens.

Male.—Antennæ 15-jointed, filiform, and longer than the body; parapsidal grooves more distinct than in the female; wings with fringe of hairs and hairs better developed on the surface of the wing. Length 1.4 mm.; otherwise as female.

Neuroterus vernus n. sp. Galls.—Almost identical with those of *Neuroterus minuta* Bass. When occurring upon the leaves they are simply enlarged petioles, but the leaf usually becomes very much dwarfed and deformed. The galls also occur in large numbers on the stamen catkins, in which case the catkins become much enlarged and irregularly swollen, and remain green upon the tree until the gall-flies within have completed their growth. The eggs are deposited in the buds of the bur-oak early in April, and the flies issue early in June. Galls taken June 10, 1888, had lost most of their flies. On April 9, 1889, the tree from which these galls were taken was again visited, the day being warm and bright, and the females found present in great numbers busily depositing their eggs. From one to a half dozen or more of these flies were present upon every bud, into which their ovipositors were deeply inserted. The galls resulting from eggs deposited at this time, began to give a second brood of flies May 16th. The tree was also visited on a bright day about the middle of April for the purpose of determining whether or not the egg-laying had ceased. At this time no living flies could be found, but many dead ones were seen that had not been able to remove their ovipositors from the place where the last eggs were laid. At this time the twigs of the tree were literally covered with what would be termed "honey-dew" which had oozed out from the myriad punctures that the buds had sustained a week or ten days before. This shiny, sticky material tasted very sweet, and one who did not know what had happened to the tree a few days previous might well wonder what could be the source of this sweet substance if it did not gather as a dew. This is one of the most abundant of the gall-flies in this vicinity where a bur-oak tree can hardly be found, the foliage of which has not been seriously damaged by it.

Gall-fly—Female.—Except joints of legs and tarsi, black; these parts yellowish brown; antennæ 12-jointed, the second joint most robust; 1—1.3 mm. in length.

Face smooth, shining black, or very finely rugose, and with very few hairs. Mandibles black at tip, and black or brown-black at base; palpi brown; antennæ with first and second joints stout and subequal in length, third joint longest and most slender, joints somewhat enlarging towards the tip, making a very slight club, terminal joint but slightly longer than the preceding, and each joint with a few short hairs. The antenna reaches slightly beyond the thorax and is composed of twelve joints. Sometimes the terminal joint, when in a favorable light, appears to be divided into two. Thorax polished and without parapsidal grooves or hairs. The mesothorax is notched posteriorly, making the scutellum appear unifoveate. Scutellum smooth and polished, and with a few scattering hairs, but no foveæ. Abdomen short, truncate, entirely black and polished. Ovipositor sheaths usually not visible; when the ovipositor is exserted full length it is longer than the abdomen. Wings 1.5 mm. in length; radial nervure not reaching the costal margin; areolet large, but rather indistinct on account of the second transverse nervure being very faint; cubital nervure visible, nervures brown. Joints of legs and tarsi brown, last joint of tarsi infuscate. Described from a large number of flies that were reared from the galls in May.

June Brood. Seven flies before me that came from the galls upon the leaves in June, 1888, differ from the preceding by having more light colored parts. The base of the mandibles, first three or four joints of the antennæ and feet are distinctly lighter colored. In some cases the anterior tibiæ and the greater part of the anterior femurs are distinctly whitish, and the antennæ are distinctly 13-jointed. Only females were obtained.

ON WHITE-OAK (*Quercus alba*).

Acraspis niger n. sp. Galls.—Small, brown, globular bodies, densely covered with a grayish pubescence which gives them the appearance of felt on their outer surface, attached to the under surface of the leaves of the white-oak in September and October. Galls exactly similar are very common on the leaves of the bur-oak (*Quercus macrocarpa*), but from these I have not succeeded in rearing the flies. Internally these galls have a fragile central cell surrounded and held in place by a dense growth of dark brown radiating fibres. The galls resemble very closely those in my collection of *Acraspis lanæglobuli* Ash.

Gall-fly—Female.—Color black, with a little reddish brown on the thorax; thorax covered with a recumbent silvery pubescence; abortive wings reaching the middle of the abdomen.

Head entirely black, finely rugose, and with very few hairs. Antennæ 14-jointed, very dark brown or black, and 2.5 mm. in length. Thorax black, with a little reddish brown above, covered with a recumbent silvery-white pubescence, the hairs rising from minute punctures in a polished surface. Scutellum small, finely rugose, without foveæ, and covered with hair like the thorax. Abdomen highly polished, with a small patch of silvery pubescence on the anterior inferior portion of the second segment. Venter tipped with a conspicuous tuft of yellowish gray hairs. Legs, except basal portion of coxæ, dark brown and densely set throughout with short gray hairs; aborted wings reaching a little beyond the middle of the abdomen. Described from a single specimen, the only one that I have been able to rear from hundreds of galls that I have collected both in Michigan and Iowa.

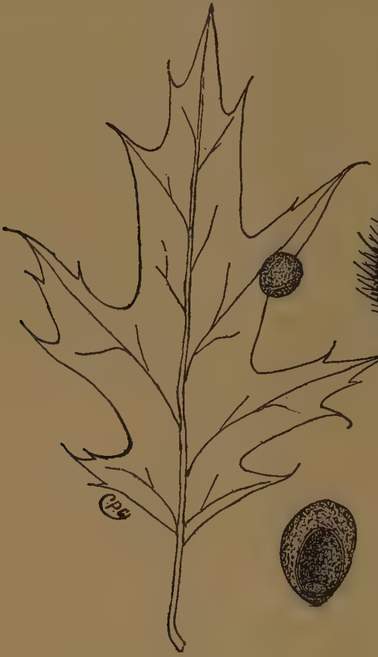

Fig. 1.

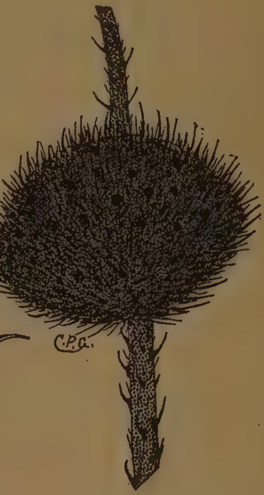

Fig. 2.

ON RED AND SCARLET OAKS (*Quercus rubra* and *Q. coccinea*)

Dryophanta liberæcellulæ n. sp. Gall.—Globular excrescences on the leaves of the red and scarlet oaks sometimes taking into themselves the entire leaf tissue and at others surrounded by the blade of the leaf as is the case of *Amphibolips nubilipennis* or *Andricus singularis*, either of which it very much resembles, but from which it differs by having a somewhat roughened and fuzzy exterior and a much thicker outer wall, and by having the larval cell perfectly free to roll about within. The galls vary from 6.5 mm. to 9.5 mm. in diameter. See fig. 1.

When gathering the galls on May 20, 1889, it was noticed that some of the flies had already escaped, and on May 28th occasional galls could be found with the flies still in them. I have taken several of these galls in Michigan, but obtained only parasites from them.

Gall-fly.—Black; feet, first four or five joints of antennæ and the palpi light yellow.

Female.—Head shining black, with two deep pits at the base of the clypeus, one on either side; face finely rugose; mandibles black, sometimes yellowish at base; palpi light yellow to yellowish brown. Antennæ 14-jointed, first four or five joints light yellow, terminal joints black, first and second joints short and stout, third joint longest, terminal joint cone shaped and a little longer than the penultimate. Thorax shining black and finely rugose, parapsidal grooves distinct; a medium impressed line begins at the scutellum between the parapsidal grooves and extends a short distance upon the thorax. Scutellum polished, bifoveate and more coarsely rugose than the thorax. Abdomen entirely black and polished; ovipositor sheaths slightly exserted and light yellow in color. Wings slightly smoky, and 3 mm. in length, areolet very small or entirely wanting. Feet light yellow, except last tarsus, which is black. Length 2.3 mm. Described from twelve reared specimens.

Male.—Length 2 mm. The yellow coloration of the antennæ shows for nearly the entire length on the under surface, the number of joints is fifteen, and they are more densely set with hairs than in the female. Otherwise as female. Eight reared specimens.

ON A ROSE BUSH.

Rhodites multispinosa n. sp. Gall.*—A large knot-like excrescence on a young shoot of a species of Rosa. The gall is reddish brown in color and densely set with sharp, stout spines, like those which occur upon stems of the bush. See fig. 2.

Gall-fly—Female.—Head rufous, almost black beneath the eyes, finely rugose and covered with gray pubescence. A little black shading on the vertex surrounds the ocelli. Thorax rufous, punctured, parapsidal grooves broad, but not deep, and extended to the scutellum. Two naked parallel lines extend a little more than one-third of the distance from the collar to the scutellum between the parapsidal grooves. Thorax, like the head, thinly set with short hairs. Scutellum more coarsely rugose than the other parts of the thorax and without foveæ. Abdomen dark rufous, polished and very finely rugose. Ventral valve black. Antennæ 14-jointed, first three joints rufous, the others black. Wings subhyaline, areolet large, marginal cell open. Length 4.3 mm.

Male.—Entirely black, except the legs and a little rufous coloring about the ocelli. Legs reddish brown. Antennæ 14-jointed, and nearly or quite as long as the body. Length 3.5 mm. Otherwise like the female.

The gall and flies of this species were kindly loaned me by Prof. Osborn, of the Iowa Agricultural College.

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* This is probably the gall spoken of by Osten Sacken on page 44 of the Proceedings of the Entomological Society of Philadelphia for 1863, Vol. II. In Bulletin 7 of the Iowa Experiment Station the specific name *spinosissima* was given to this insect without noticing the fact that a very similar specific name, *spinosissimæ* had already been used by Giraud for a related European Cynipid. In order to avoid confusion from having two names so similar in the same genus I have thought it best to change the name here to *multispinosa*.

A New Species of Feralia.

BY JOHN B. SMITH.

F. major n. sp.—General color of head, thorax and primaries a rather light bluish green fading to yellowish in old specimens, more or less powdered with black. This black powdering usually prevails in the median space of primaries, but sometimes invades the entire surface, so that the insect is really black, with a few green scales only. Usually the basal and terminal spaces, and the costal region, are green, while the median space is blackish. Described from a distinctly written specimen the markings are as follows: Basal line evident, single. T. a. line single, black, with three outward angulations, the longest and broadest in the submedian interspace; an evident, single, black, irregularly sinuate and angulate median line. T. p. line well removed outwardly, as a whole nearly parallel with outer margin, but with an outward angulation on vein 4, and an incurve over the anal angle. Opposite this curve a little black spur projects into the terminal space in most specimens. There is no s. t. line. Orbicular large, round, very indefinite, usually defined at the sides, rarely beneath, never above. The cell is black between this spot and the reniform. The latter is large, always traceable, usually well and completely defined by a black margin, in well marked specimens also, by an interior ring of white scales. Fringes greenish at base, blackish cut with white outwardly. These markings are traceable on even the darkest specimens I have seen. Thorax a variable mixture of black and green, never with definite lines. Secondaries pale, smoky fuscous, tending to become paler marginally. Beneath pale, powdery, usually with an inner and exterior common line, between which on secondaries is a distinct discal spot. These lines, however, are very variably distinct, and on the primaries usually obsolete. Expands 34—36 mm.; 1.36—1.44 inches.

Habitat.—Washington, D. C., Franconia, N. H., and Plattsburgh, N. Y.

Mr. G. H. Hudson, of Plattsburgh, to whose kindness I owe the chance of seeing a good series, has taken seven specimens, all at electric light, as follows: 1887, May 3, 8, 16 (2), 19; 1889, April 18, 28. Of these, two are now in the U. S. National Museum. Mrs. Slosson has taken a specimen at Franconia, and Mr. Schoenborn has a very perfect specimen, also taken at light in Washington very early in the year.

In all essential characters this species is a close ally of *F. jocosa*, the lines being almost identical in course, but it is not that form which shows a black median space. In *jocosa* the lines are always distinct, and the white accompanying shades marked, while the thorax has the patagiæ always neatly black lined. There is none of the powdery appearance so distinct in the new species, and finally, besides the smaller size *jocosa* has the secondaries black. The harpes of the male are in all essentials similar in both species, but the spur from the lower angle is different.

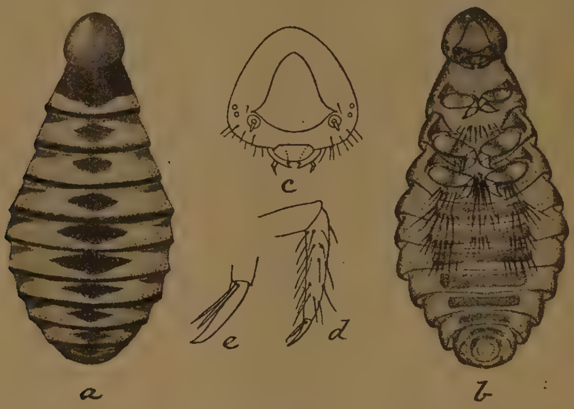
PLATYPSYLLUS—EGG AND ULTIMATE LARVA—Dr. Horn's Reclamation.

BY C. V. RILEY.

The egg and the pupa of *Platypsyllus* are yet unknown. I have for some time endeavored to obtain them, and specimens recently received as such gave hope, from the finder's account, that the lacunæ in the life-history of the genus might at last be filled. But examination dispelled the hope; yet not without adding something to our knowledge of the development of this curious beaver pararsite. The only reference to the egg is that contained in Dr. Horn's article in the "Transactions of the American Entomological Society (Vol. XV, p. 25)," where it is stated that the eggs were observed, and that "they are minute objects, not fastened to the hair, as is the case with lice, but plastered firmly to the skin among the thickest hair." This, failing in description, might apply to the egg of any other minute creature, and I have, in fact, some reason for concluding that the objects referred to in the observation were not the eggs of *Platypsyllus*, but those of quite a different insect. The eggs, as observed in the oviduct of the female *Platypsyllus*, are sufficiently uncharacteristic, except as to their flattened form; they are 0.4 mm. long and 0.2 mm. in broadest diameter, non-sculptured, white, broadly ovoid, but much flattened on two sides. The structure indicates that they may either be thrust under the scales of the skin or fastened thereto.

What was sent as the pupa, proves to be a most interesting larval stage and in keeping with the Mallophagous appearance of the beetle. This larval stage might at first sight be characterized as a Mallophagan by even the most careful zöologist. The larva, as hitherto described and figured, even in the largest specimens, whether from Dr. Horn's material or my own, has always seemed to me inexplicably small as compared with the imago, and if the form which I now describe is (and I can believe it nothing else) the final larval form of *Platypsyllus*, then the larvæ hitherto described had not yet gone through their final molt. A glance at the accompanying figures suffices to show the remarkable superficial resemblance to the lice in question, and only when the structure, especially of the leg and mouth-parts is studied, does its *Platypsyllus* nature appear. The description will also show how greatly it is modified from the earlier larval stages already described. One is justified from the facilities for grasping which it possesses, as from the position of the head, in inferring this stage quiescent, and in this respect, as well as in the marked deviation from the previous stage, it recalls the pseudo-pupa, or coarctate larva of the Meloids, and of some other parasitic forms. I have but a single specimen and have not been able to clearly make out the spiracles. One can but conjecture as to whether the pupa proper is formed, either partially or wholly, within the skin of this broadened larva, or whether the skin is completely exuviated in the transformation.

I hope that those who have opportunity to capture beavers will endeavor to obtain the much-desired pupa, and I shall be most glad to communicate with or to receive specimens from any one having such opportunity.



a, dorsal; *b*, ventral view; *c*, head from beneath; *d*, tarsus; *e*, tarsal claw (original).

Platypsyllus castoris.—*Ultimate Larva.*—Length about 2.4 mm.; greatest diameter about 1.2 mm. Nirmiform, flattened, narrowest at thoracic joints and broadest at middle of abdomen. Color grayish white, with brownish, chitinous markings. Head pale brown, peculiar, projecting from joint 1, subtriangular, flattened, occiput without structure, face and vertex completely ventral; the mandibles resting on the prosternum, rather stout and 2-toothed; clypeus very large, triangular; antennæ very small, 3-jointed, inserted in front of the lateral angles of the clypeus, the basal joint rather large, circular, flattened, disc-like, the second joint minute, as long as broad; the terminal joint much longer, slender, cylindrical, and bearing a stout bristle at tip; labrum transparent and membranous; palpi apparently 4-jointed (not distinctly made out) the terminal joint cylindrical, about one-half longer than wide and truncated at tip; just outside the antennæ are two black ocelli and several piliferous raised points. Legs rather short, stout, drawn in over the sternum; the tarsi spinose, long, 1-jointed, bearing but a single, long, quite straight claw, with two long, movable spines at base; tibiæ with but a few spines near tip. Dorsally, the prothorax is twice as long as the other joints, which are subequal in width, and the transverse brown markings include the prothorax, except a narrow posterior band, a narrow posterior border across each of the joints (obsolescing on 10, 11 and 12); a median subrhomboidal spot and a subdorsal narrower, somewhat paler spot near the anterior margin of each of joints 2–11. The posterior half of each joint is also beset with numerous pale brown granulations (obsolete on 11 and 12), but without a trace of hair. Ventrally, the thoracic joints are much lengthened, the femora show a transverse shade and the abdominal joints a dusky transverse band, shorter and more conspicuous anally. Patches of long, stout bristles occur on the dusky parts of joints 4, 5, 6, 7 more particularly, and of shorter bristles on the sternum.

While upon this subject of *Platypsyllus* I may remark that the note (page 122 of E. A. for last June) which appeared while I was in Paris amazed me not a little, and obliges me to jog Dr. Horn's memory with the following statement of facts:

1. The paper in "Insect Life," No. 10, as stated in the foot-note was read April 20, 1888, before the National Academy. It was read by request. In it I distinctly refer to Dr. Horn's first announcement of the larva before the Washington Entomological Society.

2. I could not refer to his own paper on the subject, which was not published till sometime after mine was read. The date, March, 1888, on his signature is unjustified and misleading. My assistance, acknowledged in his paper, did not begin till April 10, 1888. I was in correspondence with him on the subject during the rest of the month, and asked for advance sheets of his paper in order to be able to refer to it; but the Doctor found it inconvenient to send them as his Platypsyllus paper formed part of a more general one. He was fully advised of my intention to read a paper, and when, unable to get his advance sheets, I concluded that it might be advantageous to have my conclusions as to details published independently and uninfluenced by his, he encouraged this course, as I had offered to defer to his wishes.

3. My paper was reproduced in "Insect Life" after I left for Paris, because few entomologists had seen it in the "Scientific American," to which it was sent after reading. In reproducing it I could not well have referred to Dr. Horn's paper, nor have made any change or addition whatever without preparing a supplementary paper to include subsequent notes both on *Platypsyllus*, *Leptinus* and *Leptinillus*, which, as the Doctor had reason to know, I was getting together. This I had then neither time nor inclination to do, because, to use the language of one of his own letters to me: "I want facts and ideas, and do not care who publishes."

What is it then that Dr. Horn reclaims? Not priority of announcement, because that is admitted for him in my paper. Not priority of publication, because I have made no claim to it. The "omission" to refer to his paper I have explained. It remains only to add that Dr. Horn had no justification from my intercourse and correspondence with him, for supposing that I could have had any other reason for the "omission," or that I shall fail to refer to his paper when occasion permits. The reclamation cannot refer to priority of discovery, because Dr. Horn had the best of reasons to know that I had the larva long before he obtained it, for I had informed him of the discovery already in October, 1887. That he should have ignored this fact in his announcement before our Washington Society will be thought by some "inexcusable," and will explain why, as stated in the beginning, I was amazed at his card. I much preferred to attribute the neglect to forgetfulness and to believe that one whose work I had always admired was above the petty jealousies and narrow personalities which too often mar the conduct and writings of specialists.

A New Species of Oncocnemis.

BY JOHN B. SMITH.

Oncocnemis extremis sp. nov.—Head and thorax ashen gray, with fine black powderings. Head with front of a somewhat creamy tint, hind margin deep seal-brown. Basal joint of palpi also seal-brown. Primaries ashen gray to just beyond the t. p. line; beyond this point the wing is even smoky black, with a brownish lustre. Basal line small, single, black. T. a. line single, broad, black, more like a band than a line, evenly and not strongly outcurved. T. p. line single, black, irregular, outcurved over cell, and then in a direct course to the margin. No trace of the s. t. line in the black outer space. A broad diffuse median shade from the middle of the costa, joining the t. p. line at one-half its course. No trace of the ordinary spots. Secondaries white, with a faint yellowish lustre, a broad black outer band, continuous with that of the primaries, and narrowing to a point at anal angle; within this is a narrow black line, obsolete before reaching the anal angle; base of wings clouded with black. Beneath the maculation of the upper side is faintly reproduced, the general color whitish, powdery. Expands 1.32 inches; 33 mm.

Habitat.—N. W. British Columbia.

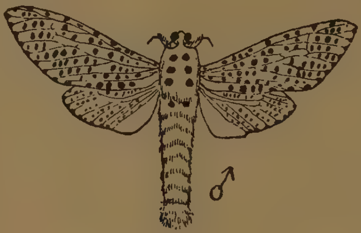
A single specimen (♀) of this strongly marked species is before me. It is an unfortunate matter that our work on the Noctuids can be so short a time complete; hardly had my monographic work been received, before a new species quite different from anything before known, claims attention. The present form comes next to *homogena* in the series, agreeing with it in the group characters, and particularly in the single transverse lines. *Homogena*, however, has the median space darkest, while in this species the broad, outer, dusky margin is distinctive.

NOTES ON ZEUZERA PYRINA *Fab.*

BY C. P. MACHESNEY.

I notice in ENTOMOLOGICA AMERICANA Vol. IV, p. 162, and Vol. V, p. 7, articles by Mr. E. L. Graef and Mr. A. R. Grote, respectively, on *Zeuzera pyrina* (Fabr.), referring to specimens taken during 1887 and 1888 by my friend and co-laborer, Mr. J. B. Angelman, of Newark, N. J., which articles still leave the question in doubt as to whether or not the appearance of this insect in this locality results from an accidental importation in the earlier stages, or has it become indiginous to the country. In ENT. AM. Vol. V, p. 28, Mr. Angelman gives his observations on the "time of appearance," which he records as "from June 14th to September 27th, a period of 106 days," which I consider an evidence that *Z. pyrina* has established itself in this vicinity, and is increasing in number with considerable rapidity. During the past summer I occasionally took this insect in Arlington, N. J., though I had been unable to find it here last year at the time it appeared numerously in Newark, from which it may be inferred that it is gradually spreading, but to what extent can only be determined by observations in other parts of the State. The proof, however, that it has "come to stay," is presented herewith in a description of the larva, kindly provided me for the purpose, by Mr. Angelman, who, so far as I can learn, is the first to discover this borer in this locality, and presumably, in this country. The larvæ were found in November and December, 1888, in the topmost small branches of some very large old elms in Newark, which had been felled by order of the authorities. From the position in which the larvæ were found it would appear that the egg is deposited at the juncture of two small branches, as the excavation began at that point and extended downward through the centre of the branch, increasing in diameter as the larva attained its growth, thus leaving the wood around the cavity very thin at time of transformation and resulting in the death of the branch from where the imago had emerged to its extremity. At the time this description was made larvæ were not quite matured.

Larva 1¼ inches in length, yellowish white in color. On the 2d to 11th segments each, are a number of minute black dots, varying in number from 10 to 14, slightly elevated and furnished with a very fine short hair (only perceptible in the smaller spots at this stage with the aid of a magnifying glass). These dots are placed on each segment, 4 dorsally, of which the anterior pair are closest together, and the remainder are lateral and sublateral. Head one-half the width of the body, round, blackish brown, adorned with a few bristles, and placed well under the first segment. Segment one semicircular viewed dorsally, and somewhat triangular laterally, and not quite as wide as segment two. Cervical shield dark brown, slightly projecting above dorsal part of segment. Larva of equal breadth from segment 2 to 10; segments 2 to 5 slightly shorter than segments 6 to 11; segment 12 adorned with a few bristles; anal shield dark brown; segment 11 also has a dark brown band across the posterior dorsal margin. Thoracic legs short, concolorous with body. Abdominal legs very small and retractile.



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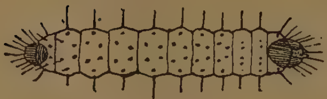

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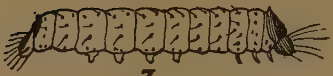

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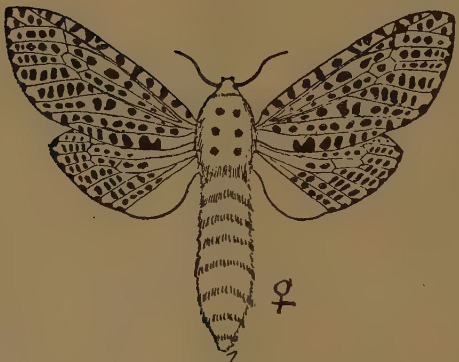


b

Owing to the difficulty of keeping the larvæ supplied with *live* wood, Mr. Angelman was unable to successfully rear them to the imago state, and while believing the identity of the insect to be beyond question at the time, I deferred presenting this description to the readers of ENTOMOLOGICA AMERICANA until I had seen the description and figures of *Z. æscula* (*pyrina*) of Europe as given in Kirby's "European Butterflies and Moths," plate 26, fig. 2 *a b*, with which the larva coincided in all particulars. Some empty pupa shells were also found in the branches of the same tree in cavities identical with those in which the larvæ occurred. These cavities were somewhat enlarged at the bottom, where the pupa lay inclined upward toward the opening through which the imago had escaped. The upper part of the cavities was filled with sawdust excrements solidly packed, the hole being large enough to enable the larva to reverse itself, it having been found "looped" several times. The pupa shells were in such an imperfect state as not to admit of a detailed description.

A Waspish Love-Struggle.

Col. John Bowles, of this city, a reliable observer, and a gentleman who takes a keen interest in Nature, tells us of an interesting sight which he noticed last October in Richmond County, Ga.: Walking along a country road with two friends, an animated black and yellow ball as large as one's fist was noticed moving about on the ground. A closer look showed that the ball was composed of wasps; perhaps eight or ten smaller ones and one larger. It was not long before Col. Bowles discovered that the larger one was a female, while the others were all males struggling to mate with her. The female at first seemed disinclined, and held the tip of her abdomen turned under and out of their reach. Presently, however, she held it out and opened the valves, when immediately one of the males mated with her. Coition lasted not more than ten seconds, and after a few moments another male was allowed access. Meantime, the whole mass of males continued in the most frantic excitement, clawing and biting at the fortunate individual and at each other. They were watched until all but one of the males had copulated, when the female, seeming to tire, thrust out her sting and made an angry noise, at which the last male fled.

Col. Bowles is not familiar with the species of Digger-wasps, but from his description we think this one must have been either *Sphecius speciosus*, or *Monedula carolina*. L. O. H.

NOTES AND NEWS.

In an able Presidential address made by Mr. E. A. Schwarz before the Entomological Society of Washington, he reviews, in a general sort of way, the literature of American Entomology. Its development and nature were spoken of, as were also some of its characteristic features—good and bad. One remark struck us as remarkably pertinent, and would almost seem to suggest that sometime or other Mr. Schwarz has occupied an editorial position. He says that the chief peculiarity of the American Entomologist is, that he does not subscribe to the periodicals of his own country! It may be an overestimate when we say that there are not more than 250 entomologists in North America who regularly subscribe to an entomological journal. ENTOMOLOGICA AMERICANA sends out over 200 copies monthly, but of these many are to members, active and honorary, and many more are sent as exchanges. This is really a bad showing, and indicates how little encouragement entomologists give to journals published in their interest. ENT. AMER. costs annually over $500 for printing, mailing and incidentals, and against this about $250 comes from subscribers, slightly more, perhaps, during the last year. The balance is lessened somewhat by the sale of back volumes, but about $200 remains as a deficit, to be met by the Society. Now, this has always been met, and will be met for the current and future volumes, but our readers could, with a little effort on their part, help us considerably by remitting promptly, by recommending the paper to their cronies interested in insects, and by adding a little to our publication-fund now and then when finances are in a flourishing condition. It does seem too bad that the few journals published in America should not be more generously supported.

Our paper was late last month, and the last part of Vol. V was badly delayed. Complications resulting from the union of the Society with the Brooklyn Institute locked up our funds for nearly three months, and the cussedness of the former printer (proverbial and well understood) was responsible for the rest. We have gotten a new start now and hope to get along swimmingly in future.

Mr. Ashmead is again at Jacksonville, Fla. He expects to leave for a European trip before many months, and will make studies in the famous collections there. He promises the completion of a monographic work on the *Proctotrupidæ* before leaving.

NEW CALIFORNIA HOMOPTERA.

BY E. P. VANDUZEE.

To the kindness of Mr. D. W. Coquillett, of Los Angeles, Cal., I am indebted for the opportunity of studying a very interesting series of Homoptera from the West coast. This collection has proved of great interest, not alone on account of the large number of new species it contains, but principally, perhaps, for the clearer light it throws on the relationship existing both between the American Homopterous fauna and that of Europe, and between the several members of our own Eastern fauna. A number of the new species here made known, falling into the older genera, seem to connect these with other genera, or to show a type of variation before unknown in this country. Thus *Thamnotettix subœnea* reminds us, especially by its ornamentation, of *Scaphoideus*. *T. coquilletti*, in the same respect, recalls *Calliscarta*. *T. geminata* in most of its characters would be taken for a *Cicadula*, while *T. limbata* represents, possibly, a new generic type, related to *Thamnotettix*, as is the European *Anoterostemma* to *Athysanus*. *Deltocephalus coquilletti* might readily be mistaken for an *Athysanus* and *Pediopsis nubila* for an *Agallia*. In *Jassus lactipennis* we have, perhaps, the smallest species of the true Jassids yet known, and very probably the type of a new genus of this interesting group, which includes such genera as *Jassus* Fab. (Stal.), *Terulia* Stal., *Petalopoda* Span., *Palicus* Stal., etc. *Allygus inscriptus* deserves notice as being the only North American species, at least as far as known to me, that falls exactly within the limits of the genus as characterized by Dr. Fieber.

Aside from the species described below, this collection contains fourteen forms of the *Typhlocybidœ* that I have not yet studied; three or four species the descriptions of which have been reserved for publication with related material from the East, which I hope will soon appear; a few forms that require the study of more extensive material before they can be satisfactorily characterized, and eleven that I have been able to identify with already described species.

Species absolutely identical with European forms are remarkably few in this collection,—only two have thus far been recognized, and form a proportionately smaller element than in our Eastern fauna. But there are many species closely related to their European congeners, and it is not unlikely that, with a full series of the Californian *Jassidœ*, a very observable correspondence with the European fauna would appear. Comparisons of this character are, however, of little value without the study of more extensive material than we now possess. The first duty of our entomologists is to make known the numerous species occurring in their country; for, until this is done, we can have no accurate knowledge of our own fauna or of its relations to those of other countries. Then, too, will there appear a more general interest in these small and despised, albeit frequently beautiful creatures; and collectors will account them worthy of preservation when inadvertently taken by them while in quest of larger game, and students will not, as at present, be obliged to solicit in vain for exchanges, or go in person for the desired material, or do without it.

A few of the terms and measurements employed in the following descriptions possibly call for a word of explanation. The length of a specimen is measured from the tip of the head to the apex of the elytra, or of the abdomen if it projects beyond the elytra. Width of the head includes the eyes; width of the pronotum is supposed to be measured across at the widest point, generally at the lateral angles, or the angles between the lateral and latero-posterior margins. In the nomenclature of the venation I have adopted that employed by Dr. Fieber as in all respects the most convenient and satisfactory. In Fieber's scheme for separating the genera of the *Jassidæ* the element of the neuration of the elytra and wings is given a very prominent position, and I think justifiably so, notwithstanding the fact that it is subject to frequent and considerable variations.

In all the *Jassidæ* the variation in the form of the genital pieces furnish very important characters for distinguishing the species, but in these descriptions I have made use only of such parts as can generally be seen without mutilating the specimen. In the male they are as follows: The *Plates* are two flat, or slightly convex, pieces placed on the ventral surface, with their inner edges in contact so that together they generally form a more or less regular triangle, which may be short and blunt, or long and narrow, with the sides either convex or concave; on the edge they are generally fringed with long hairs, and there is at times a submarginal row of stouter spines. On the base of the plates is a triangular, rounded, or short and transverse piece called the *Valve;* it varies much in shape, and the apex may be acute, obtuse, or emarginate. Beneath the plates as viewed from below, are two long, more or less slender and curved pieces termed the *Styles;* they are rarely mentioned, as they are generally concealed from sight beneath the plates. Still farther behind these, and really forming the apical segment of the tergum, are the Pygofers; they are placed on each side enclosing the anus, and are approximate above and below, and in these descriptions have, for the sake of convenience, been considered as one; as a rule, the aperature formed by them is somewhat oval, with the narrow end within on the ventral surface; here are attached the hooks or claspers, which are more or less slender, spine-like processes, curved inward and upward toward the anal style. Sometimes the pygofers are much elongated, and their surface, or at least their apical margin, is generally beset with stiff bristles. In both sexes, but particularly in the females, the form of the hind edge of the last ventral segment is very various in the different species, and is a specific character of primary importance. The sexual characters of the female, aside from the form of this ultimate ventral segment, are of a simple kind, and of but little comparative importance. The pygofers, which constitute most of the visible portion of the genitalia, present slight variations in form, but are of little value in determining the species.

For drawing up these descriptions I have used a compound microscope with an inch and one-half objective, but the more important characters could probably be made out with a good Coddington lense magnifying about fifteen to twenty diameters.

The locality from which this material was derived may be stated as Southern California. Most of it was obtained, Mr. Coquillett informs me, from the vicinity of Los Angeles, only a little from as far north as Newhall, about thirty miles. The numbers appended to the descriptions are those of Mr. Coquillett's collection.

BYTHOSCOPIDÆ.

1. Pediopsis nubila n. sp. *Bythoscopus nubilus* Uhl. ms.

Form of *P. punctifrons*, but larger. Head obtusely angled before, pronotum coarsely punctured, without oblique rugæ. Elytra almost coriaceous, coarsely punctured, with numerous irregular transverse nervures almost obliterating the ordinary venation. Pale grayish brown; elytra whitish, clouded with brown. Length 3.5—4 mm.

Head broader than the pronotum, rather obtusely angled. Face coarsely punctured above, more minutely so below; apex of the front broad, angles rounded; clypeus broad, the sides parallel, apex rounded and a little depressed beyond the loræ, furnished with a few short stiff hairs on the margin; loræ broad, transverse, almost angled outwardly. Rostrum long, reaching the apex of the intermediate trochanters. Pronotum rather long, posterior margin less deeply arcuated than in our other species: latero-posterior margins reaching the eyes; surface coarsely punctured, punctures not obviously arranged in oblique lines; a more or less distinct impunctured central line. Scutellum, excepting the basal angles and the calloused margin each side of the apex, coarsely punctured. Superior surface of the propleura hidden beneath the eye. Elytra broad; costa strongly convex; clavus and corium, the apex excepted, thick and coriaceous, coarsely punctured; nervures strong, somewhat irregular, connected, especially toward the apex, by numerous irregular transverse nervures. Ultimate ventral segment broad and short, almost pentagonal in outline, the short, abrupt apex with a shallow triangular notch; disc depressed, with a central impressed line. Pygofers broad, oblong, with a short, bluntly conical apex; surface covered with short, scattering hairs.

Color: Head, pronotum and scutellum grayish yellow, punctured with pale brown; apex of the face and central pronotal line whitish. Eyes brown. Legs and all beneath soiled yellowish white; a few obscure markings on the femora above and an annulus near the base of the tibiæ, on the anterior and intermediate feet, obscure brown; posterior tibiæ with black points at the base of the spines. Elytra obscure brown, pale and subhyaline toward the apex, with two indistinct, whitish, oblique bands, the basal extending from near the tip of the scutellum to the middle of the costal margin; the second is more obscure, or almost obsolete, and extends from the middle to the apex of the claval suture obliquely to the apex of the costa; basal punctures brown, nervures toward the apex whitish. Wings whitish, nervures pale brown.

Described from two female examples (N. 226). Very distinct from its American congeners, and easily distinguished by the thick coriaceous, ramously veined elytra, and short ventral plate. In these characters it appears to be quite unique, at least I know of no exotic form exhibiting peculiarities analogous to these.

2. Agallia oculata n. sp.

Form of *A. 4-punctata* Prov., to which it is closely allied. Fulvous brown; elytra dark brown, with pale nervures; two large spots on the disc of the pronotum, and several smaller ones along the anterior margin and on the face, black. Length 4 mm.

Vertex much shorter at the middle than next the eye. Front broad, sides nearly straight above, rounded below to the base of the clypeus. Clypeus narrow, oblong, slightly contracted at the base, the apex subtriangular. Loræ narrow. Cheeks narrow, outer edge obtusely angled near the middle, below coalescing with the outer edge of the loræ. Pronotum somewhat pentagonal in form, or lozenge-shaped, with the posterior angle truncated before the scutellum; anterior angle rounded, the disc before somewhat tumid; latero-posterior margin feebly rounded, reaching the eye before, posterior angles rounded; surface transversely wrinkled. Scutellum small, the anterior field largely covered by the pronotum. Elytra longer than in the eastern *4-punctata*. Last ventral segment of the female long, about equalling the two preceding; hind edge feebly and regularly arcuated; disc with a narrow, depressed, longitudinal line on the middle. In the male this segment does not differ from the penultimate.

(To be continued.)

Description of Eterusia urania n. sp.

BY WILLIAM SCHAUS, JR.

Primaries above olivaceous brown. A narrow yellow band crosses the wing from the middle of the costal margin, and does not quite touch the inner margin at three-fourths of the distance from the base. This band is bordered on either side by a series of velvety black spots, interrupted by the veins, which are tinged with deep metallic blue wherever separating the black spots, and lilacine where crossing the yellow transverse band. Secondaries above velvety black. Between the median vein and the abdominal margin two-thirds of the wing from the base deep metallic blue; on the apical half of the outer margin a row of blue spots longest at the apex. Primaries underneath black, the base largely metallic blue and green. A transverse yellow band from the costal to the inner margin, and a submarginal row of metallic spots. Secondaries underneath black, the abdominal margin broadly deep metallic blue, the base and costal margin shaded with green; an irregular transverse row of small chrome yellow spots from just beyond the middle of the costal margin to near the anal angle. Along the outer margin a row of light blue metallic spots. Antennæ, which are deeply pectinated at their extremities, dark blue. Frons dark green. Collar and thorax brown, tinged with green. Abdomen above dark metallic blue, underneath brown. Exp. 77 mm. 1 ♂.

Naga hills, Assam.

The continuation of Mr. Leng's "Synopsis" is crowded out this month; better luck next time.

One of the most notable features among the Lepidoptera frequenting the electric lights at Newark last summer was the very large number of a little Tineid, which, from specimens in the U. S. National Museum, I make to be *Laverna phragmitella*, an European species. The label on the specimens states that it is on *Typha*, of which there is an abundance near Newark. There is one other American specimen in the Museum from Fortress Monroe, Va.

A revision of the *Tæniocampinæ* is in press, and will appear at an early date in the Proc. U. S. National Museum.

In speaking of *Raphiteles maculatus* (Ent. Am. v. 216) I quoted from a somewhat indefinite statement in Mr. Howard's letter determining the species for me. As the matter stands now it conveys the impression that the pararsite had been heretofore bred *only* from *Scolytus rugulosus*. As a matter of fact it had been only so bred in the Department, but there are a number of other hosts known in Europe. *Pissodes strobi* is, however, really a new host, so the note has not lost point.

SOCIETY NEWS.

Meeting Dec. 3, 1889, at Brooklyn Institute, President Casey in the chair —23 persons present. The minutes of the November meeting were approved. The report of the librarian showed the donation to the library by Mr. A. W. P. Cramer of twenty-five books and pamphlets. Miss Elizabeth A. Wilckins, of No. 261 Henry Street, Brooklyn, associate member of the Institute, was elected a member of the Department.

Rev. J. L. Zabriskie read a paper entitled, "Note on some Case-bearing Lepidoptera feeding upon the seeds of Juncus," illustrated by enlarged diagrams showing the plants bearing seeds, with cross sections of the latter; also of the larvæ and protecting cases. Larvæ inhabiting three forms of cases had been taken. The larvæ had been found clinging to the seeds of *Juncus Greenii* Oakes & Tuckerman, and *Juncus tenuis* Willd. No imago had been obtained, but an identification of the species found upon the first-named plant by Mr. Hulst, showed it to be *Coleophora cispiticella* Walsingham.

Mr. Smith gave a description of the mouth parts of *Stomoxys calcitrans* and *Hæmatobia serrata*, a recently imported species. An examination of the mouth parts in each species revealed no variation in either case thus proving them to be of the highest value as a means of classification and identification. He also stated that he had recently noticed in handling *Empretia stimulea* that the spines on parasitized larvæ had lost their urticating properties. Discussion on the nature of the urticating properties of several Lepidopterous larvæ was participated in by Messrs. Smith, Hulst and Weeks. No one had noted the fact stated by Mr. Smith, but it was general knowledge that the hairs of certain *Arctiidæ* retained their irritating properties even after removal from the caterpillar.

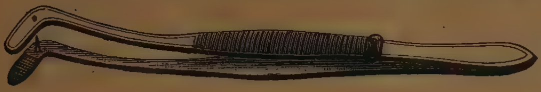
A. C. Weeks,
Recording Secretary.

◆

In "Humboldt" for December, 1889, is an interesting statement of the amounts expended by the Prussian State Forestry Commission to control the ravages of forest insects only. In 1884–85 were spent 200,550 Marks; in 1885–86 were spent 171,404 Marks; in 1886–87 were spent 191,645 Marks. Of these sums the control of *Hylobius abietis* alone took from 107,200 to 109,300 marks. The sums are suggestive, and yet all of it was absolutely necessary for the prevention of serious damage. Even with these sums, and the trained officials to apply it the success in lessening the ravages was not satisfactory. It was not possible to do more than keep the pests in check. The destruction of the Cockchafer in the larval state is also still in the experimental stage, and the results are not satisfactory. The complaints in other parts of the empire of damage by white grubs are even greater than they are in Prussia, and some practical remedy would be a boon of inestimable value.

JOHN AKHURST,

Taxidermist and Dealer in Entomological Supplies



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10.	First Supplement to Henshaw's Check-List of Coleoptera, by Samuel Henshaw, 8 pp. 1887	.25
	Second Supplement, with Bibliographical References, 14 pp. 1889	.25
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Business communications relating to the journal should be made to the assistant editor.

Subscriptions and other business communications should be sent to the treasurer.

Insects for identification, or as donations to the collection of the Society, go to either of the curators.

ENTOMOLOGICA AMERICANA

VOL. VI. BROOKLYN, MARCH, 1890. No. 3.

Proposed Corrections of Specific Names to Harmonize Mr. Henshaw's Catalogue of the North American Coleoptera, with the generally accepted European nomenclature, with relation to the species common to the two continents.

BY JOHN HAMILTON, M. D.,
Allegheny, Pa.

The Roman type indicates the proposed name; Italics, the name now in Henshaw's Catalogue and Supplements (sometimes that in the European). Small Caps indicate a species represented only by a variety of the European form.

- Dyschirius æneus *Dej.*
  - *frigidus* Mann.
  - *integer*, *dentiger* Lec.
- Clivina fossor *Linn.*
  - *collaris* ‡ Lec.
- Bembidium littorale *Oliv.* (1791).
  - *paludosum* ‡ Catalog.
- B. ustulatum *Linn.*
  - *rupestre* ‡ Catalog.
- B. grapei *Gyll.*
- B. flammulatum *Clairv.*
  - *undulatum* Sturm.
- Amara apricaria *Payk.*
- A. erratica *Duft.*
- Platynus obscurus *Herbst.*
  - *oblongus* Fab., *pusillus* Lec.
- P. bogemanni *Gyll.*
  - *obsoletus* Say.
- P. IMPRESSUS *Panz.*
  - var. splendidulus *Mots.*
- Bradycellus cognatus *Payk.*
- Hydrovatus pustulatus *Mels.*
  - *cuspidatus* ‡ Catalog.
- Cœlambus inæqualis *Fab.*
  - *punctatus* Say.
- Deronectes brevis *Sturm.*
  - *depressus* ‡ Catalog.
- Hydroporus SANMARKI *Sahlb.*
  - var. rivalis *Gyll.*
- Agabus congener *Thunb.*
  - *ambiguus* Say.
- A. dissimilis *Sahlb.*
- A. confinis *Gyll.*
  - *ovoideus* Lec.
- A. erichsoni *Gem.* and *H.*
  - *nigroæneus* Er.

Rhantus suturalis *Lac.*
notatus Fab.
Colymbetes dolobratus *Payk.*
var. grœnlandicus *Aube.*
Graphoderes cinereus *Linn.*
fasciatocollis Harris.
Helophorus granularis *Linn.*
Cercyon nigriceps *Marsh.*
centrimaculatum Sturm.
Pteroloma forstrœmii *Gyll.*
Bryaxis sanguinea *Linn.*
Homalota sordida *Marsh.*
lividipennis Mann.
H. graminicola *Grav.*
granulata Mann.
Tachyusa pygmæa *Sachse, not Am.*
Aleochara nitida *Grav.*
var. verna *Say.*
anthomyiæ Sprague.
Placusa tachyporoides *Watl.*
? despecta Er.
Gyrophæna affinis *Sahlb.*
Gymnusa brevicollis *Payk.*
Myllæna dubia *Grav.*
Acylophorus glabberrimus *Hbst.*
Quedius fulvicollis *Steph.*
hyperboreus Er.
Creophilus MAXILLOSUS *Linn.*
var. villosus *Grav.*
Philonthus perforatus *Fauv., Horn.*
atratus ‡ *Horn.*
P. picipennis *Maek.*
Stenus montivagus *Er.*
pterobrachys G. and H.
brevipennis Maek.
S. nanus *Stephens.*
pusio Casey.
S. pumilio *Er.*
atomarius Casey.
S. humilis *Er.*
mammops Casey.
S. canaliculatus *Gyll.*
congener Maek.
S. argus *Grav.*
ageus Casey.
S. morio *Grav.*
subgriseus, *indistinctus* Casey.
S. tarsalis *Ljung.*
reconditus Casey.
Lathrobium quadratum *Payk.*
nigrum Lec.
var. terminatum *Grav.*
punctulatum Lec.
Tachinus basalis *Er.*
circumcinctus Maek.
T. apterus *Maek.*
Tachyporus nitidulus *Fab.*
brunneus Fab.
Conosoma bipustulatum *Grav.*
bisignatum Horn.
Bolitobius pygmæus *Fab.*
3-*maculatus* Say, *venustus* Mels.
B. angularis *Sachse.*
pygmæus ‡ Horn.
B. exoletus *Er.*
3-*notatus* ‡ Cat. *facilis* Casey.
B. pœcilus *Mann.*
Olisthærus substriatus *Payk.*
Oxytelus laqueatus *Marsh.*
fuscipennis Mann.
O. rugosus *Fab.*
O. nitidulus *Grav.*
punctatus Lec., *? nitidulus* Lec.
O. tetracarinatus *Block.*
depressus Grav.
Trogophlœus pusillus *Grav.*
subtilis ‡ Lec.
T. corticinus *Grav.*
fulvipennis Fauv.
T. memnonius *Er.*
mancus, *spectatus* Casey.
Geodromicus plagiatus *Fab.*
ovipennis Lec.
var. nigrita *Muell.*
Orochares angustata *Er.*
Olophrum fuscum *Grav.*
latum Maek.
Homalium florale *Payk.*
rufipes ‡ Fauv.
Adonia variegata *Goeze.*
constellata Laich.
Coccinella transversoguttata *Fald.*
C. 11-PUNCTATA *Linn.*
var. menetriesi *Muls.*
Anatis ocellata *Linn.*
15-*punctata* Oliv.
Rhyssodes americanus *Lapl.*
exaratus ‡ Ill., Westw.

Silvanus gemellatus *Duv.*
quadricollis ‡ Casey, Lec.
S. cassiæ *Reiché.*
gilæ Casey.
Nausibius clavicornis *Kug.*
dentatus Marsh.
Cryptophagus lapponicus *Gyll.*, *verus* (nec. Reitter, nec. *pubescens* Sturm).
beringensis J. Sahlb.
Anthrenus verbasci *Linn.*
varius Fab.
A. museorum *Linn.*
A. fuscus *Latr.*
claviger Er.
Orphilus niger *Rossi, not American*
Epuræa terminalis *Mann.*
immunda Er.
Ips 4-guttatus *Fab.*
var. fasciatus *Oliv.*
Lathridius consimilis *Mann.*
parallelocollis Mann.
L. constrictus *Gyll.*
carinatus Gyll.
Corticaria pubescens *Gyll.*
piligera Mann., *grossa* Lec.
C. ferruginea *Gyll.*
fenestralis Auct., *deleta* Mann.
C. elongata *Gyll.*
Melanophthalma distinguenda *Com.*
morsa, pumila Lec.
subangulata Mots.
M. similata *Gyll.*
subimpressa Zimm.
Cryptohypnus dermestoides *Herbst.*
var. 4-guttatus *Lapl.*
Melanotus castanipes *Payk.*
♀ *scrobicollis* Lec.
Athous undulatus *DeG.*
Corymbites sericeus *Gebler.*
C. nigricornis *Panz.*
metallicus Payk
Melanophila acuminata *DeG.*
appendicula Fab., *longipes* Say.
M. GUTTULATA *Gebler.*
var. drummondi *Kirby.*
Opilus domesticus *Sturm.*
Necrobia rufipes *DeG.*

Gibbium psylloides *Czenpinsk.*
scotias Scop.
Trigonogenius (Sphæricus) gibboides *Boield.*
Xestobium rufovillosum *DeG.*
tessellatum Fab.
Aphodius aleutus *Esch.*
ursinus Mots.
A. putridus *Herbst.*
fœtidus Fab.
Oxyomus sylvestris *Scop.*
porcatus Fab.
Phymatodes variabilis *Linn.*
P. lividus *Rossi.*
thoracicus Comolli.
Rhagium INQUISITOR *Linn.*
var. lineatum *Oliv.*
Adoxus obscurus *Linn.*
vitis Fab.
Entomoscelis adonidis *Pallas.*
Plagiodera armoraciæ *Linn.*
cochleariæ Panz.
Bruchus chinensis *Linn.*
scutellaris Fab.
B. pisorum *Linn.*
pisi Linn.
B. rufimanus *Bohm.* should be dropped.
Blaps similis *Latr.*
mortisaga in error.
B. mucronata *Latr.*
Alphitobius ovatus *Herbst.*
diaperinus Muls.
A. piceus *Oliv.*
mauritanicus Fab. *diaperinus* Panzer.
Alphitophagus bifasciatus *Say.*
quadripustulatus Stephens.
Xylita lævigata *Hellen.*
Hypulus vaudoueri *Muls.*
fuscus Lec.
Anthicus basilaris *Say.*
quisquilius Thoms.
Otiorhynchus linearis *Linn.*
picipes Fab.
Sitones lineellus *Bonsd.*
Hypomolyx piceus *GeG.*
pineti Fab.
Tanysphyrus lemnæ *Payk.*

Acalyptus carpini *Fab.*
Ceutorhynchus cyanipennis *Germ.*
Gyll.
  sulcicollis Gyll.
Rhinoncus pyrrhopus *Bohm.*
Phytobius *velatus* ‡ Lec. = n. s.
Xyloterus lineatus *Oliv.*
  bivittatus Kirby.
Dryocœtes autographus *Ratz.*
  septentrionis Mann.
Crypturgus pusillus *Gyll.*
  atomus Lec.
Hylurgops glabratus *Zett.*
  pinifex Fitch.

The following synonymy is proposed for consideration:

Rhantus GRAPEI *Gyll.*
  var. sinuatus *Lec.*
Chalcophora MARIANNA *Linn.*
  var. virginiensis *Herbst.*
  var. angulicollis *Lec.*
Tragosoma DEPSARIUM *Linn.*
  var. harrisii *Lec.*
Asemum STRIATUM *Linn.*
  var. mœstum *Hald.*
Criocephalus RUSTICUS *Linn.*
  var. agrestis *Kirby.*
Monohammus SUTOR *Linn.*
  var. scutellatus *Say.*
Gastroidea viridula *DeG.*
  formosa Say.
Pytho DEPRESSUS *Linn.*
  var. americanus *Kirby.*

Species, the European synonymy of which appears to be chaotic, and which it is prudent to retain in our catalogues with the present names till the matter is settled. Italics indicate the unsettled names as they relate to our fauna:

Licinus silphoides *Fab.* = *punctulatus* Fab. [unnecessary.]
Pristonychus terricola *Hbst.*; whether this or inæqualis *Panz.* is the older is unsettled.
Bradycellus cognatus *Payk.* = *deutschi* Sahlb.
Hydroporus morio *Sharp* = *morio* Gem. and H. [some confusion.]
Rhantus bistriatus *Bergst* = *suturellis* Harris [some confusion.]
Cercyon flavipes *Fab.* = var. of *hæmorrhoidale* Fab.
Orphilus glabratus *Fab.* = *niger* Rossi.
Nitidula bipustulata *Linn.* = *bipunctata* Linn. [unnecessary.]
Corymbites tessellatus *Linn.* = *sjælandicus* Mull. [distinct species.]
Bruchus obsoletus *Say* = *obtectus* Say [equal in point of time, and obsoletus takes the precedence by long use.]
Otiorhynchus maurus *Gyll.* = *dubius* Stroem.
O. monticola *Germ.* = *arcticus* Fab.
Sciaphilus muricatus *Fab.* = *asperatus* Bonsd.
Lepyrus colon *Fab.* = *palustris* Scop.
Hylastes trifolii *Mull.* = *obscurus* Marsh.

Last summer I took *Ceutorhynchus erysimi* Fab., at Pocatello in southern Idaho. This species has been recorded from Kansas (Knaus, Trans. Kan. Acad. of Sciences, vol. ix, p. 60) and also occurs in Iowa. How widely it may have been distributed over the East I do not know.

H. F. WICKHAM.

New Species of Mexican Lepidoptera.

BY WILLIAM SCHAUS, JR.

(Continued from p. 20, vol. vi.)

MELAMERIDÆ.

Flavinia jalapæ n. sp.—Above primaries black, with a large round spot of bright yellow near the apex, and a semiovate yellow space on the inner margin from the base to near the internal angle. Secondaries bright yellow, the outer margin bordered with black. Underneath the markings the same as on the upperside, the apices of the primaries, however, faintly tipped with white. Head and antennæ black. Collar yellow. Abdomen black dorsally, yellow laterally and underneath. Expands 35 mm.; 2 ♂♂ 1 ♀.

Jalapa.

LASIOCAMPIDÆ.

Cœculia fibra n. sp.—Male—Primaries above: basal half whitish, except a small space at the base and two contiguous transverse lines close to this small space, which are gray; outer half gray, paler along the outer margin, and separated from the inner whitish portion of the wing by two contiguous dark gray, transverse lines. Secondaries grayish white, with indistinct central and submarginal transverse grayish markings. The abdominal margin clothed with long grayish scales. Underneath dull white, with a broad dark transverse band on the primaries. Head and thorax brownish, mixed with yellowish scales. Abdomen subdorsally grayish, laterally and underneath yellow. Expands 35 mm.

Female.—Above dark gray, with two contiguous transverse lines at the base of the primaries of a darker shade, and two similar lines crossing the same wing just beyond the cell. A submarginal, transverse, wavy band of a slightly darker shade than the ground color. Underneath uniform dull gray. Head and thorax gray. Antennæ ochreous. Abdomen above gray, with transverse rows of dark yellowish scales; underneath deep yellow. Expands 52 mm.; 2 ♂♂ 2 ♀♀.

Coatepec.

Hydrias deformis n. sp.—Primaries above brown, a conspicuous round black spot in the cell, and a row of small black spots along the outer margin, most conspicuous at the internal angle, and gradually diminishing towards the apex. Secondaries brown, darkest in the centre and along the abdominal margin; a couple of small black spots near the apex. Underneath uniform light brown. Head, thorax and abdomen above, dark brown; underneath paler. Expands 36 mm.; 1 ♀.

Paso de San Juan.

Ocha macerra n. sp.—Primaries above white, at the base a small, and at the apex a large blotch of rich brown. Secondaries yellowish, white at the base; a small, rich brown spot at the apex. Underneath whitish, the costal margin of the primaries broadly bordered with brown. Head and thorax white. Abdomen golden yellow, except a dorsal tuft of white hairs at the base. Expands 20 mm.; 2 ♂♂.

Paso de San Juan.

LIMACODIDÆ.

Echedorus infernalis n. sp.—Primaries dull grayish black, crossed by numerous transverse angular markings of black and brown-gray. A small black spot at the end of the cell. Secondaries dull black. Underneath dull black, with a light, marginal, wavy band on the primaries. Collar and thorax black, base of patagiæ pink-brown. Abdomen dull black dorsally; underneath mixed with a few paler scales. Expands 38 mm. 1 ♂.

Jalapa.

BOMBYCIDÆ.

Dicranura platea n. sp.—Primaries silvery white, crossed by six wavy black lines from the costa to the inner margin; the first close to the base, the second interrupted in the cell by a circular black spot, beneath which the transverse line is double, the third crossing about the centre of the wing, the fourth crossing at the end of the cell, and between this line and the third there is another smaller black circle in the cell; the fifth and sixth lines rather heavier than the others, the sixth having at the apex a shorter black line contiguous to it. On the extreme outer margin a row of conspicuous black spots. Secondaries grayish, with indistinct marginal and submarginal lines, and a row of small black spots on the extreme outer margin. Underneath brown-white, fringes white; a row of black spots on the extreme outer margin of both wings; a few black marks on the costal margin of the primaries, and two indistinct transverse bands on the outer portion of the wings. Head and collar white; thorax anteriorly streaked with black, and otherwise spotted with black. Abdomen silvery gray, with transverse black lines, anus velvety black. Expands 42 mm., 1 ♀.

Jalapa.

DREPANULIDÆ.

Perophora inscita n. sp.—Wings above fawn color, thinly powdered with black scales. The costal margin of the primaries at the apex, and the outer margins and fringes of both wings olive-brown. An olive-brown line crosses both wings from just below the apex of the primaries to the anal angle of the secondaries ; this line is faintly bordered outwardly with yellowish. On the costal margin of the primaries about two-thirds from the base a small cluster of black scales. A very small crescent-shaped transparent spot at the end of the cell on the primaries, and a small black spot on the cell of the secondaries. Underneath paler, with the markings of the upperside repeated, but the transverse band is very indistinct on the secondaries, and at its upper extremity on the primaries it turns abruptly inwards to the costal margin, forming an acute angle. Head, thorax and abdomen fawn color speckled with black. Expands 33 mm.; 1 ♂.

Coatepec.

HEPIALIDÆ.

Phassus basirei n. sp.—Primaries pale fawn color, thickly mottled with gray streaks and light brown. Several dark brown spots and black streaks along the costal margin, and along the outer margin a series of *u*-shaped marks of a deep brown. Near the base of the wing and starting from the subcostal vein, a very irregular wavy brown band strongly outlined with black; at first this band is moderately wide, then narrows, beyond it suddenly bulges to treble its original width, and rapidly tapers to a fine black line on the inner margin near the base. A dark brown space at the end of the cell, inwardly outlined with black and enclosing at its outer extremity a triangular silver spot. Secondaries dull brown, faintly spotted on the costal margin; the fringe is spotted with light brown at the end of the nervules. Underneath dull brown, with light spots on the costa of both wings. Exp. 150 mm.; 2 ♀♀.

Coatepec.

NOTODONTIDÆ.

Anodonta fascis n. sp.—Primaries above fawn color, mottled longitudinally with different shades of brown, the costal margin towards the apex and the inner margin being narrowly streaked with black and reddish brown. The outer margin consists of first a pale brown streak, then reddish brown, bordered outwardly by a fine, irregular black line, afterwards light brown, and the base of the fringe blackish. All these markings form together but a narrow border to the outer margin. At the end of the cell three whitish transverse streaks unite in forming a noticeable spot, and beyond this to the border of the outer margin the wing is very pale fawn color. Secondaries dull brown, with the outer margin reddish brown, preceded at the anal angle by a blackish shade. The extreme outer margin marked with two fine brown lines; the fringe towards apex light, towards anal angle dark. Underneath light brown, a black streak on extreme outer margins. Head and thorax dark fawn color. Abdomen above dark brown, underneath light brown. Exp. 85 mm.; 2 ♂♂.

Jalapa.

A Contribution to Hymenopterological Literature.

At the February, 1889, meeting of the Entomological Society of Washington, there occurred an animated discussion on the habits of *Bombus* and *Apathus*, especially with reference to the economy of *Apathus*, the majority of the members holding the received view that these bees are inquilines. At the close of the discussion the following corruscation was presented by the poetical member, which, at the time, was well received on account of its aptness to the discussion rather on account of its rhythmical merit. It may be necessary to state that Continental pronunciation is given to the diphthong "æ".

Oh! an Apathus sat on a Chrysanthemum
  A-cleaning her antennæ,
And she little thought of the Pyrethrum
  That would take her life away!

And there she sat, a-taking a rest,
And smiled in a satisfied way,
For she'd laid ten eggs in a Bombus nest,
And there'd soon be the de'il to pay.

For her offspring dear, her very first brood,
Would hatch in a very short time,
And no trouble she'd have a storing up food,
For she worked on the Cuckoo line.

Her young would hatch ere the young bumble-bees,
And the young bumble-bees would die,
While the young Apathi would live at their ease
And fatten like pigs in a sty!

So she sat in the sun, this wicked old bee,
And scratched her tibiæ,
And chuckled inside in lazy glee
At the business she'd done that day.

* * *

But the Chrysanthemum on which she sat
Belonged to a neat old maid,
Whose plants were her pride (next to her cat),
And that day she was out on a raid

Against Aphids and slugs, with a Buhach-gun
Filled with Peters & Milco's best,
And seeing the Apathus, just for fun,
She dusted her yellow vest.

Lord! how the cheat kicked as she fell on the ground!
And how she did buzz and hum!
But she never got well—she never "came round"—
Her fraudulent life was done.

* * *

From this little tale can a moral be drawn—
How the bumble-bee loafs not a bit;
But works all day from the earliest dawn,
And thus 'scaped the death-dealing hit?

This moral is good, but please don't forget
Those eggs that the Apathus hid!
The Bombus is working and slaving yet,
But it's all for the other one's kid!

Dr. Horn has been appointed Professor of Entomology at the University of Pennsylvania. The Doctor could do us no greater favor than by graduating many young men to follow in the lines he has so well staked out!

NEW CALIFORNIA HOMOPTERA.

BY E. P. VANDUZEE.

(Continued from p. 38, vol. vi.)

Agallia oculata.—Continued.

Color: Superior edge of the vertex and the broad outer margin of the cheeks whitish; loræ, clypeus and disc of the front pale fulvous. Sutures of the face, central longitudinal line on the vertex, two round spots on the ocelli, two larger ones above these on the superior margin, three small ones adjoining each eye, antennal cavities, and a few transverse lines on each side of the front, black. Eyes dark brown. Basal joints of the antennæ whitish. Central longitudinal line of the pronotum, two large oval or subtriangular spots placed obliquely on the disc either side of this medial line, two minute ones near the apex, and a small one on the posterior margin behind each eye, black; anterior margin and an area behind each of the large discal spots obscured with brown. Scutellum pale, the basal angles, two small points between them, the short transverse impressed line, and a longitudinal line dividing the posterior field, black. Elytra dark brown, paler toward the costa, the nervures whitish. Pectus black. Coxæ and legs pale; lower surface of the anterior and intermediate femora and all the tibiæ, especially the posterior, clouded with fuscous; claws black. Abdomen testaceous brown, or almost fuscous, sometimes darker on the disc of the tergum and venter; genital pieces pale.

Described from two individuals, representing both sexes (No. 278). The dark markings are without doubt subject to more or less variation in intensity and extent as in our allied eastern form, *A. 4-punctata*, which this represents in the Californian fauna. The male is paler in color than the female, thus bringing the dark spots into stronger contrast.

JASSIDÆ.

3. Jassus lactipennis n. sp.

Form oval, short and thick. Color soiled white or yellowish. Elytra milky, or subopalescent white, nervures simple, strong; tergum black. Length about 4 mm.

Head a little narrower than the pronotum, prominent before. Vertex pentagonal in form, obtusely angled before, hind margin slightly concave, length next the eye subequal to the breadth; passage to the front rounded; front narrow, convex, the sides parallel. Clypeus oblong, about one-half the width of the front, truncate at the ends. Loræ small, extending from the lower angles of the front to a little beyond the middle of the clypeus. Cheeks narrow, sides concavely arcuated from the outer angles of the eyes to the loræ, then rounded to the apex, which in the male distinctly surpasses the clypeus. Eyes, viewed from the side, almost round, from above oval. Ocelli minute, on the edge of the vertex quite distant from the eyes. Antenna very long, basal joints stout, base of the seta thick, but tapering rapidly to a slender bristle. Rostrum short, hardly reaching the tip of the anterior trochanters, composed of two joints, the second a little the longer; pronotum short, especially in the male, hardly more than half the length of the vertex; angles prominent, posterior margin concave, subparallel to the anterior; surface obscurely transversely striated. Scutellum longer than the pronotum. Elytra narrowed toward the tip; costa uniformly arcuated from near the base to the apex; appendix very narrow; nervures prominent, punctured, first sector forked once at the basal third, where a transverse nervure unites it with the simple second sector, thus forming one small basal, two long discal, and four short apical areolets; costal areole broad. Clavus with two nervures, the inner short and curved inwards to the suture, but little behind the point of the scutellum; first two sectors of the wings united in one before their end; third sector forked on its apical fourth and united to the second by an oblique nervure; supernumerary cell present. Legs normal; basal joint of the posterior tarsi exceeding in length the two following.

Color: Male.—Head pale dull fulvous yellow, clearer on the central line of the vertex and near the ocelli; extreme tip with a small black point and another adjoins each ocellus without; front with a brown longitudinal vitta each side. Eyes black, pronotum dusky whitish, with three paler longitudinal lines, the lateral somewhat oblique. Scutellum pale yellowish white, with a short, oblique, brown line near each basal angle in continuation of the inner claval nervure. Elytra subhyaline, dull subopalescent or milky-white; nervures brown, dotted with white, paler at apex. Wings whitish hyaline, iridescent; nervures brown and conspicuous. Beneath black, pectoral pieces edged without with pale. Abdomen black, connexivum and edge of the segments pale; apex of the genital pieces whitish. Legs soiled white, apex of the tarsal joints and lower face of the posterior tibiæ embrowned.

Female.—Head, pronotum and scutellum dull white, tinged with yellow; frontal vittæ pale salmon color, or sometimes wanting. Tergum and all beneath soiled white; base of the tergum, and occasionally a few spots on the sternum, black; first two sectors of the wings pale and indistinct, otherwise like the male.

Genital pieces: Male.—Valve wanting, plates long, narrowed above to the obtusely rounded tips; with a few scattering hairs.

Female.—Last ventral segment longer than wide; apex straight, with a minute central notch. Pygofers broad, not produced at the apex; a little shorter than the ovipositor, fringed with a few short hairs.

Described from one male (No. 629) and two female (No. 277) specimens. Superficially, this insect bears a marked resemblance to *Tettigonia tripunctata* Fitch, although the two species are very distinct structurally. It differs from the genus *Jassus* as restricted by Stal in the simple neuration of the elytra and the consequent less number of apical areoles, the convex front, the narrower clypeus, and the elongated antennal setæ, and probably forms the type of a distinct genus. It has much the form of *Jassus gratiosus* Span. as figured by its author (Of. K. Vet. Ak. Forh. Vol. 36, No. 6, p. 25, plate 16, fig. 10, 1879), but is shorter and differs by most of the characters given above as separating it from Stal's genus. It is certainly a very interesting addition to the Jassid fauna of N. America. The opalescence of the elytra is much more manifest in some examples than in others, but otherwise there seems to be but little tendency to variability in the species.

4. Scaphoideus scalaris n. sp.

Smaller and less robust than *S. immistus* Say, which it approaches in ornamentation. Pale testaceous, varied with brown; elytra whitish hyaline, with brown nervures and areolar spots. Length about 5 mm.

Head narrower than the pronotum, forming an almost regular equilateral triangle, the posterior margin deeply arcuated, vertex horizontal, apex obtuse, passage to the front rounded. Front long and narrow, sides nearly rectilinear, a little incurved at the apex. Clypeus narrow, widened at the rounded apex, which moderately surpasses the cheeks. Loræ as wide as the clypeus. Cheeks broad, feebly angled opposite the middle of the loræ, with which they coalesce before reaching the clypeus. Antennæ about as in *immistus*. Hind margin of the pronotum straight, latero-posterior margins more oblique than in the allied species, and the lateral angles more prominent.

Color pale testaceous. Vertex with a transverse brown spot anterior to the middle, behind which a broad whitish shade runs to the hind margin, bisected longitudinally by a fine brown line and obscurely margined with the same color; posterior to this brown mark is a similar, but slightly oblique one on either side of the central whitish line, extending outwardly from its margin nearly to the anterior angle of the eye; anterior margin of the vertex with an angulated brown line, beyond which on the extreme edge are five whitish spots, three on the apex and one adjoining each ocellus, or these may be reduced to a single arcuated spot each side of the apex. Temples alternated with brown and white. Face pale testaceous, embrowned beneath the eyes, front brown, with the central and lateral transverse lines and the margin pale, or pale, with transverse brown lines more or less confluent above. Base of the antennæ pale, second joint with a brown ring, setæ brown, paler at base. Rostrum pale, tip black; pronotum alternated with brown and cinereous on the anterior margin; disc obscurely irrorate with pale, and with an indistinct pale central line. Scutellum obscurely varied with pale testaceous and cinereous, sometimes with brown spots on the basal angles. Elytra whitish hyaline, faintly obscured with pale fulvous in about three transverse clouds; nervures and the centre of some of the discal areoles on the corium pale brown; two short transverse nervures beyond the apex of the costal area, two others on the sutural margin beyond the tip of the clavus, and the broad apex fuscous, sutural margin of the clavus with three small fuscous spots, one on its extreme tip and another on the apex of each claval nervure. Wings hyaline, iridescent; nervures fuscous. Beneath pale tescaceous, faintly embrowned on the middle of the pectoral pieces and on the sides of the ventral segments. Tergum fuscous, the incisures and margins pale. Legs soiled white, the lower surface of the femora obscurely clouded with pale brown; tip of the tibiæ, the tarsal joints, and a minute point at the base of the tibial spines on the posterior feet blackish.

Genital pieces: Male.—Last ventral segment broadly excavated on the posterior margin. Valve short, occupying the concavity of the hind margin of the last ventral segment; its posterior edge but feebly convex, with a minute central tooth. Plates flat, rather long-triangular, their edges almost straight, above abruptly narrowed to long, slender, flaccid tips, clothed at their apex with soft white hairs. Pygofers much longer than the plates, thickly beset with long, stout, brown bristles.

Female.—Penultimate ventral segment narrowed at the middle, the ultimate long, rounded toward the apex, which is truncated and compressed against the sides of the pygofers; surface finely punctured. Pygofers long and narrow, clothed with stiff bristles.

Described from six individuals representing both sexes (No. 605 male, No. 623 female). This neat little species is very closely allied to *S. consors* Uhl., but appears to be sufficiently distinct. It is quite variable in the shade of the ground color, and in the depth and extent of the dark markings, especially on the abdomen.

The genus *Scaphoideus* has been recently characterized by Mr. Uhler in the "Trans. of the Maryland Academy of Sciences for 1888, p. 33 (1889)," and by M. Provancher in his "Petit Faune Ent. du Canad. Vol. 3, p. 276." It agrees with *Thamnotettix* and *Phlepsius* in wanting the second short transverse nervure connecting the inner branch of the first sector with the second sector, and by this same character may be separated from *Platymetopius*, with which it seems to be nearly parallel. Its true position will doubtless be found between the two former genera which it serves in a measure to connect. It is distinguished from all other genera of the *Jassidæ* known to me by its elongated antennal setæ.

(To be continued.)

Regarding Stenopodius flavidus.

The remarks of Prof. Smith on this insect in Vol. V of ENT. AMER. p. 122, have reminded me of an observation I made while in Arizona which tends to disprove the correctness of Dr. Horn's surmise that the species is subaquatic in its habits. I captured two specimens of this remarkable insect on a low plant (one of the *Malvaceæ* I believe) at least three miles from any water. Their presence in such a situation leads to the belief that they can hardly be subaquatic, as it is doubtful if two specimens would travel so far from water over such an exceedingly dry country and come to rest on the same plant. These two specimens were all I ever saw. Taken at Winslow, Ariz., in early July. H. F. WICKHAM.

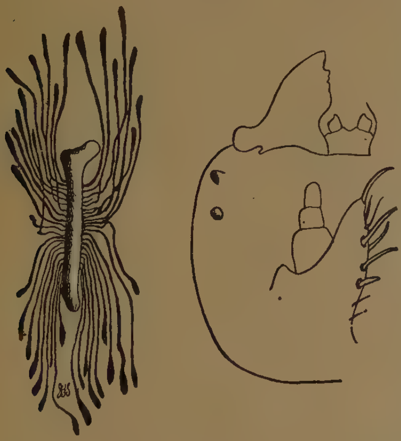
NOTES ON SOME SCOLYTIDS.

BY JOHN B. SMITH.

During the early days of April I found opportunity to study several species of *Scolytidæ* still in their burrows. Some of these species have not yet been satisfactorily determined. To Mr. E. A. Schwarz I owe the identification of species here treated of.

Chramesus icoriæ Lec.

Quite common in Hickory twigs from three-fifths to one inch in diameter. The burrows are mainly in the wood and just traced on the bark. The main channel made by the imago is clean, upright, usually about an inch in length, with an enlargement at one side, usually at the top, but quite frequently also at the bottom, enabling the parent beetle to turn in the burrow. The form shown in the annexed figure is characteristic and observable in all specimens. From each side of this main gallery arise the larval galleries, which are always closely packed with the sawdust made by the larva. These galleries vary greatly in length; some, containing a fully grown larva, being scarcely a third of the length of others containing larvæ no whit larger. They start from the main gallery at right angles, but usually turn up or down almost immediately if at either extreme of the gallery, or as soon as they get beyond the range of the preceding gallery. It is comparatively rare that there is a crossing of galleries; often there will be scarcely a shaving between them. Rarely a larva will get tired of mining across the grain, and will strike boldly upward or downward crossing whatever is in the way to get a free space. When the larva is fully grown the gallery is rather abruptly widened as a pupal chamber. At this date, April, none of the larva have transformed, but they have ceased feeding. The figure will show the appearance of the galleries. The larva is curculionid in form, pure white, about one-sixteenth of an inch in length, and with a brown, chitinous head, usually retracted so as to show only the mandibles. The form



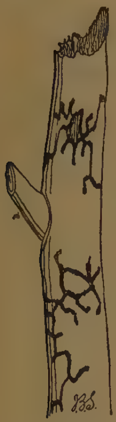
of the head is indicated in the annexed figure. There are two ocelli on each side, very distinctly shown: the mandibles are very stout, curved, with a broad gouge-like cutting face, somewhat irregularly serrate or dentate, the opposing edges meeting accurately. The maxilla is broad, fleshy, furnished with a double series of stout, longer and shorter spines. The palpus is 3-jointed, the joints smooth, short and stout. The labial palpi are 2-jointed, the basal joint broad and flat, not visible, except on careful examination, the terminal joint obtuse; the other features are scarcely characteristic enough to describe, and the figure will give a good idea of the mouth parts.

HYPOTHENEMUS Westw.

This genus deserves the careful study of a specialist, judging from my observations made on the biological side of the matter. From grape stems, infested by *Phymatodes amœnus*, I bred also a series of Scolytids making perfectly straight, longitudinal galleries, and occasionally boring a clean hole to the pith. Two-sized specimens differing in form and vestiture were found, which I accepted as male and female, and these Mr. Schwarz named as *H. dissimilis* for the more robust form, and *H. eruditus* (large form, *hispidulus* Lec.) for the slighter form. I was convinced we had here the two sexes of one species, but such occurrences in the Scolytids are not rare, i.e., where male and female are described as specifically distinct, and I thought nothing of it. All the galleries seemed made by the imagos and I saw no trace of larvæ.

Some few days later, in cutting oak branches, I ran across a lot of small twigs which had the centre hollowed out, and, rammed up at one end, a line of beetles varying in number from three to six; there were no larval galleries, and the infested twigs were only about double the diameter of the inclosed beetles. There were here also two sizes represented, and altogether they closely resembled the grape species. I sent them to Mr. Schwarz, and in due time received a return; the larger specimens, *H. dissimilis;* the smaller, *H. erectus.* These two forms in oak I am also convinced are sexes of one species, though what the exact relation of the *erectus* in oak to the *eruditus* (*hispidulus*) of the grape may be I will not venture to state. Unless polygamy exists among Scolytids I will not venture to guess why the males to both *eruditus* and *erectus* seemed to be *dissimilis.*

About the same time I found, with *Chramesus icoriæ*, in smaller branches of the same trees a small species making a somewhat distinctive gallery, a figure of which is also hereto annexed. In each case there is a very irregular main gallery, from which branch off in all directions and at very irregular intervals, short, irregular galleries. Usually there is, in about the centre of the system a loop, connecting two main series and giving origin to several larval galleries radiating in all directions. At the time I collected the twigs the beetles were quiescent in the side galleries. The galleries seemed uniform in diameter throughout, and were in the wood rather than the bark. At about the same time I found in the stems of oak cut for *Elaphidion* larva, a very similar species with galleries very much the same, but much more numerous and much less definite for that reason. Two sizes were represented here also, but all of them less than half the size of the grape or other oak species. These also I sent to Mr. Schwarz, and in due time received the legend: "*H. eruditus* West. a little larger than typical form," and "*H. eruditus* West. typical size." Here my faith ends! I feel certain that *hispidulus* Lec. is not *eruditus* Westw., and I am as certain as any one can well be from field work merely, that *dissimilis* Zimm. and *hispidulus* Lec. *do* refer to sexes of the same form. Where *erectus* Lec. may go I am not so certain, but if it be distinct from *hispidulus*, then the male cannot be the *dissimilis* Zimm.



The "Ultimate Larva" of Platypsyllus.

BY GEO. H. HORN, M. D.

In the February ENTOMOLOGICA Dr. Riley describes what he calls the "ultimate larva" with so many details very greatly different from those previously described by him and myself in what, for convenience, I will call the "penultimate larva," that I have thought it advisable to direct attention to them.

It may be stated axiomatically that the larvæ of coleoptera, more particularly in their final period, develop *toward* the imago without any abrupt changes, which cause them to differ *both* from an earlier stage and from the imago.

The so-called "ultimate larva" violates the above proposition in many important particulars, but for present purposes the head is alone taken for review.

In the larva and imago of *Platypsyllus* the head is of semicircular outline, the broadest portion being the base. In the "ultimate larva" the head is of triangular form with curved sides and rounded angles, broadest across the front.

In the larva and imago there is no trace of eyes or ocelli, while there are two ocelli on each side in the "ultimate larva."

No labrum, whatever, exists in the larva, and but a doubtful rudiment in the imago, while the "ultimate larva" has a rather large, well-developed labrum.

The mandibles of the larva are slender, lancet-like, while none exist in the imago; the "ultimate larva" has a bidentate and normal-looking mandible, according to the description and figure.

The antennæ in the larva are situated at or slightly under the hind angles of the head, in the imago very decidedly in the latter position, but in the "ultimate larva" they become frontal!

Although I have not seen Dr. Riley's specimen, I am satisfied (if his larva is a *Platypsyllus* at all) that figure "c," p. 28, represents the underside of the head and not the front, the antennæ slightly within the hind angles by the drying of the specimen, while the somewhat triangular area at the centre of the head is the limit of the buccal cavity, as may be inferred by an examination of previously published figures. I am equally certain that neither the so-called labrum nor mandibles can be demonstrated in the position in which he represents them, in any *Platypsyllus* larva in any stage.

It is highly probable that Dr. Riley's descriptions were made from a dried specimen requiring much manipulation for study, and that the real mouth parts, very soft at best, have become shrunken beyond recognition.

To me it is incomprehensible that an "ultimate larva" should present such radical differences from the larva from which it has developed and from the imago toward which it is developing.

In conclusion, I will ask a careful comparison of previous figures published by Dr. Riley and myself with that of the "ultimate larva" as given on p. 28. That there has been a grave blunder in one or the other is, I think, indisputable, and I feel very willing to leave the matter to the inference of students of insect morphology.

The fearless and excellent young Lepidopterist, Mr. Doherty, who has been collecting for me for the past two years in Borneo, Malayan peninsula, Naga hills of Assam and surrounding countries, has added fresh laurels to his fame by constantly making new discoveries. Some of the types just described in the Entomological Society of Bengal adorn my collection. Many of his highly interesting letters read like the adventures of a Stanley, and I shall publish extracts from them from time to time. B. Neumoegen.

Description of the Larva of Thymalus fulgidus Er.

BY WM. BEUTENMUELLER.

Color: body above and below sordid white. Head light brown, mandibles and cervical shield piceous, as is also the anal process.

Head subglobose, shining, smooth; anterior portion somewhat narrower than the posterior. *Eyes* five on each side, minute. *Clypeus* transverse, much broader than long, sides somewhat oblique. *Labrum* about one-third the size of the clypeus, anterior margin rounded. *Mandibles* short, stout, apex obtusely bifid. *Antennæ* very short, 4-jointed, first and second joints thick, third joint shorter, last joint slender, more elongate, with a short process at the base.

Maxillæ elongated, lobe rounded at the apex, with a few bristles. *Maxillary palpi* 3-jointed, not extending beyond the lobe, first and second joints same size, subglobose, third joint more slender. *Labium* quadrate, as broad as long. *Labial palpi* 3-jointed, all of about equal width, subcylindrical, first joint stout, second joint more slender, third joint rounded at the apex.

Body elongate, convex above, somewhat flattened beneath; posterior extremity with a short fork-life process with a few small tubercles. Thoracic feet short. The body, up to about the fourth segment, is of equal width, then becoming somewhat broader, last segment tapering; on the body above are three rows of depressed spots and two rows beneath.

Length about 6 mm. Width about 3 mm.

Pupa sordid white, subfusiform, body tapering to a blunt point at the posterior extremity, which is provided with two short tubercles. Each segment laterally is furnished with a short tubercle, and on the body above are three rows of small, elevated spots on each side. Thorax smooth, shining, anterior margin truncate, with the head bending downward. Antennæ, wing-cases and legs free.

Length 6 mm. Width 3 mm.

Lives in numbers in a large species of white fungus growing on trunks of prostrated white birch trees. The eggs are deposited late in fall and emerge the following spring. The larva becomes full grown in May. According to Chapius et Candeze (Mem. Soc. Liege viii, p. 417, 1855) the larva of *Thymalus limbatus* of Europe, is found under the bark of wild plum apparently living exclusively upon the woody substance.

A HINT TO COLLECTORS.

The present season promises to be an early one, and Lepidopterists, *especially*, should be on the lookout for the early moths. Many of our rarest species are extremely early flyers. The bombyciform *noctuidæ*, like *Feralia* and its close allies, fly in March and April. Wherever the electric lights are conveniently located it will pay to keep a close watch on them.

In a little book by Fritz Rühl, "Der Köderfang der Europæischen Macrolepidopteren," I notice a dodge that was new to me, and may be to many of our readers. He says diurnals may be attracted in numbers if, in the vicinity of favorite resorts, some twigs and leaves convenient for the collector, be smeared with Limburger cheese! The butterflies are very fond of this, ahd may be easily approached and taken. The method is certainly worthy of trial. The early blossoms should not escape attention during the evening, and sugaring will pay. Mr. Rühl says that a few drops of sulphuric ether to the sugaring mixture adds greatly to its effect.

For the easy recognition of sugared trees when making the rounds, a piece of white paper stuck on a twig is suggested.

Mr. Lugger writes us among other things: "I shall collect all the Lachnosterna I can by beating, as no electric lights are near by, and those in the city are a nuisance, being over 100 feet above the streets. I always thought that the invention of electric lights was simply and solely made in the interest of Entomology—not to enlighten entomologists, but to furnish him with specimens. Another illusion gone!"

Poor Mr. Lugger, we can understand his feelings! It has occurred to us, that we have seen at lights high in air, some desirable moths circling round without a chance to coax them within reach.

Mr. William Schaus, Jr., the clever and enthusiastic young Lepidopterist, left London for Brazil, about three months ago, on an extended collecting tour for objects of natural history. As he is assisted by young Baron Rothchild, genius and money will undoubtedly contribute to make the interesting trip a perfect success.

B. Neumoegen.

CRESSONIA HYPERBOLA n. var.

BY ANNIE TRUMBULL SLOSSON.

I give the above name to a very striking form of *C. juglandis* found by me last Spring in Florida. My one specimen is a female, much smaller than the usual form, and even a little smaller than any male in my collection. The coloration is very pale and uniform, somewhat like that of Mr. Strecker's *pallens*, but with a purplish tinge. But the distinctive peculiarity of this form lies in the course which the two median lines take. The upright basal line is as usual, except that it is somewhat diffuse; the next spoken of by writers in their descriptions of *juglandis* as "at basal third and more nearly perpendicular to costa" than the basal line, runs as usual until just below vein two (medio posterior), when it joins the third line. This third runs as in the ordinary form, from outer third of costa, curving obliquely inward, but grows abruptly more oblique and meeting the second line, the two form a loop, which lies on and below vein two. The lower part of the usual median lines is entirely wanting, as is also the dark shade between them, which, in the ordinary form, makes a patch upon inner margin. The outer line parallel with second median is present and distinct; the peculiar loop, open to costa and taking the place of the usual transverse median lines, gives the wing a striking and unfamiliar look, and suggests the varietal name I give to this form. The secondaries have but one transverse line, the usual inner one being absent. My specimen was taken at light in Green Cove Springs, on the St. John's River, Florida.

SPECIAL NOTE.

In accordance with custom, numbers 1, 2 and 3 are sent to all our old subscribers; but no future numbers will be sent without subscription first received. We would respectfully urge our friends to remit promptly and to try and persuade others to subscribe. The greater the income the better the paper; we are not looking for dividends, but support, and we really ought to receive it at the hands of the entomological public.

To facilitate matters we would beg the attention of correspondents and exchanges to the notices on the second page of cover.

SOCIETY NEWS.

Meeting Jan. 7, 1890.—Twenty-one persons present. Capt. T. L. Casey presiding. Reports of the Treasurer and Assistant Editor respectively, for the year ending Dec. 31, 1889, were read and accepted. Col. William C. Beecher, of 123 Columbia Heights, a member of the Institute, was elected a member of the Department. The election of officers was postponed until the first meeting in May, to correspond with the other departments of the Institute. The election of editor or editors was laid over until the February meeting. Mr. Roberts opened the scientific discussion by exhibiting specimens of *Deronectes Hydroporus* and *Dineutes* and pointed out differences of structure existing in individuals now associated under one species in each of these genera, which differences from their constancy seemed to indicate that they in fact belonged to distinct species. Mr. Hulst was appointed to read a paper at the next meeting. Mrs. A. T. Slosson presented to the Society ♂ and ♀ specimens of *Seirarctia echo*, which were accepted with thanks.

Meeting Feb. 4, 1890.—Thirty-four persons present. Capt. T. L. Casey, President, in the chair. Mr. Henry S. Woodman explained a method of preparation and mounting of entomological specimens for microscopic purposes. Pasteboard rings could be readily made by using two gun-wad punches differing in diameter of cut, say one-eighth of an inch, the outer edge being cut first. A glass slide was then placed upon a turn-table and the balsam applied in the usual manner, but always slightly larger than the cut on account of the shrinkage of the balsam in drying. No solicitation need be felt on account ot air bubbles, which in time would disappear. The cut was laid in position by a pair of tweezers and then adjusted by a needle point applied to its inner edge, after which more balsam was added until it projected above the cut. The object to be examined was then deposited in the balsam and arranged under a lens, with the needle point, after which a cover-glass of smaller diameter than that of the cut was placed over the balsam, and the edges made to correspond by a short spatula-like steel blade, the cover-glass being then firmly pressed upon the cut, which completed the work. Prof. Smith added that by boiling the balsam on the glass over a flame, all air bubbles were immediately expelled, the balsam was hardened, and the slide could be used forthwith.

Dr. Zabriskie presented a double-sided case devised by himself for containing botanical specimens. The two sides being of equal size, joined by a hinge at the back. Two rows of cards of three each, upon which the specimens were glued, exactly filled each side, the upper edges of the upper row and the lower edges of the lower row being inserted in a groove running along the top and bottom of the cases, while the edges of the cards where they came in contact in the middle were prevented from displacement by a retaining bar, consisting of a flat narrow strip of wood, one end of which could be fitted in a cavity, in the side of the case, and the other fastened by passing over a small spring. The bar could be released by pressing back the spring, and cards rearranged if desired.

The cases contained twelve specimens of portions of the stems and leaves of *Rosa carolina* and *lucida*, affected by several species of Cynipidæ and exhibiting nearly all the effects produced by the several species of these insects upon the wild rose in this locality.

Mr. Meeske presented to the cabinet a cocoon and pupa of *Samia cynthia* filled with partially developed ichneumons, and a number of specimens of the perfect ichneumon.

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Insects for identification, or as donations to the collection of the Society, go to either of the curators.

ENTOMOLOGICA AMERICANA

VOL. VI. BROOKLYN, APRIL, 1890. No. 4.

NEW BEAUTIES FROM NEAR AND FAR.

BY B. NEUMOEGEN.

Parnassius smintheus, var. *nanus.*—Prominent entomologists of both hemispheres arrived at the conclusion years ago, that the *P. intermedius* Mén. and the *P. smintheus* Doubl.-Hew. of this country are one and the same insect. Typical specimens from western Siberia, which I possess, do not leave the least doubt as to this fact. The Parnassidæ of eastern Siberia, Ochotsk, Kamtschatka, migrated centuries ago across Behring Straits, settling from Alaska down the Rocky Mountain range as far as the borders of New Mexico.

P. eversmanni, which was first discovered at Kanska and Ochotsk, was obtained in moderate numbers at Nicolajewsk in the last few years, and is the same insect as the one found in Alaska, especially in the Yukon country. Even its female variations, named *P. wosnesenskii* by Ménetries, and *P. thor* by Hy. Edwards respectively, are synonyms, thus substantiating the migration theory. As the northern and southern climate of our "Rockies" vary considerably, some variations of *P. smintheus* have developed, but they remain true to our country, and deserve proper denomination.

One of the prettiest variations in its way, which was found by Capt. Geddes, near Fort Calgarry, some years ago, and lately by the botanists of Dr. Dieck, the owner of the renowned Arboretum at Zoeschen, Germany, at Spence's Bridge, both places being in British Columbia, I have named var. *nanus.* It is the smallest kind of *smintheus* found in America and exceedingly pretty.

It is of the *sedakovii* order, but more pronounced. In the ♂ not a vestige of red is left, either on primaries or secondaries. The apex of primaries and the greater part of the exterior margin are of vitreous scales. The only markings on secondaries being the black basal margin fading out towards median cell, and a prominent discal spot.

The females are of the *hermodur* order—dark, the entire apical and outer marginal part being transparent on primaries; the two subcostal red spots always looking faded. No other red markings on primaries. Secondaries are equally dark and vitreous along exterior margin; the red ocelli marked with whitish centres and all the black delineations prominent. Expanse of wings: ♂, 1¾ inch.; ♀, 1⅞ inch.

Our present nomenclature of *P. smintheus* stands as follows:

Parn. smintheus Doubl.-Hew.
    intermedius Mén.
  Var. *behrii* Edw., Nevada, Utah.
  Var. *sedakovii* Mén., Colorado.
  Var. *hermodur* Hy. Edw., Colorado.
  Var. *nanus* Neumoegen, British Columbia and Montana.

I do not understand why the var. *sedakovii*, where there are no red markings in primaries and at times some in a universal way only in secondaries, has never been mentioned in any of our catalogues. It is to be found in the canyons of middle and south Colorado, and occasionally in Montana and British Columbia.

Arctia dieckii nov. spec.

Head, palpi and orbit of eyes black; black vertex between the antennæ, which are bi-serrate and entirely black. Thorax yellowish white, with two prothoracic dots and three large thoracic maculations of black color. Palpi hairy; abdomen and legs black. Primaries black; costa has a yellowish white edge from base to about apex; inner margin narrowly edged with yellowish white from base to over half its extension. Fringes alternately yellowish white and black. Markings of yellowish white as follows: the usual horizontal broad line from base to within outer margin; two transverse lines divergent on costa, but nearing each other, the anterior line resting on horizontal streak; between the anterior transverse line and outer margin the usual zigzag line from costa to horizontal streak, forming the two irregular, triangular fields; two irregular small spots, costal and subcostal respectively, between base and interior line. Secondaries and fringes entirely black, with the following markings of yellowish white color; around disc irregular, small blotches enclosing it in semicircular shape and extending somewhat towards exterior margin; an irregular submedian spot. Beneath the markings are the same. On secondaries there is another irregular blotch of yellowish white between base and discal ornamentation. Expanse of wings 1½ inch. Length of body ⅜ inch.

Habitat.—Spence's Bridge, British Columbia.

Type coll. B. Neumoegen.

This insect belongs to the *determinata* group, from which it is easily distinguished by its black body and antennæ, its intense black color of wings and its larger size.

Collected by the botanists of Dr. Dieck, of Zoeschen, Germany, in whose honor I have named it.

Spningicampa bisecta var. *nebulosa* n. var.

My indefatigable collaborator, Mr. Doll, has raised this charming insect. It is a ♀ of large size, and is heavily powdered with grains of blackish brown color.

On primaries the diagonal line from apex to the basal centre of interior margin is very prominent, forming a conspicuous line of blackish brown, the space between this line and exterior margin being especially powdered, somewhat fading towards margin. Discal spot prominent and suffused with grains of blackish brown. Secondaries of a rich yellow with a beautiful roseate basal hue fading towards centre.

Type coll. B. Neumoegen.

Horama jalapensis n. sp.

Head black; palpi creamy white; orbit of eyes black. Antennæ black, with whitish tips; a vertical spot of creamy white between antennæ. Patagiæ and thorax scaled with creamy white spots. Abdomen black, with segments of creamy white, the segment near thorax being broken up in creamy white spots. Legs heavily tufted, as in *H. texana.* The tuft of black color with stem and tips of creamy white hair. Primaries and secondaries, and fringes of uniform grayish black color above and below. By these peculiarities this insect is easily distinguished from *Horama texana.* Expanse of primaries 1½ inch. Length of body ⅜ inch.

Habitat.—Jalapa, Mexico. Collected by Mr. Wm. Schaus, Jr.

Type coll. B. Neumoegen.

SYNTOMIDÆ.

Genus **IRA** Neumoegen.

Wings of the peculiar shape of *Syntomis*, but not vitreous. Secondaries extremely narrow, ovate-lanceolate, about one-third the size of primaries. From base to apex of secondaries, traversing submedian nerves, a semi-vitreous, very distinct fold. Head rather small, free. Eyes prominent; palpi distinct, with acute terminal joint. Antennæ biserrate. Body slender, not quite the size of primaries. Legs slender, without tibial spurs.

The characteristic of this genus is its intense rose color of wings, thorax and body, the anal half of latter being dark black, much resembling some South American *Zygænids* in its ornamentation. It is a native of Cuba and very rare, as Dr. J. Gundlach has only found this one insect in his forty years' researches.

Ira gundlachiana n. sp.

Head and orbit of eyes black; palpi white; a white vertical spot between antennæ, which are moderate, bi-serrate and of brown color. Thorax and patagiæ of rose color, with indications of black centre line, tipped in white. Abdomen above, thoracical half of beautiful rose color, anal half black, with slight rose colored tuft; below, entirely white, with black segments. Legs white. with black spots, especially discernible in posterior tibiæ. Primaries nearly three times as large as secondaries, of the most beautiful, intense rose color. Costa, anterior and half of inner margin narrowly edged with black; between costa and exterior margin a large, apical, triangular field, with two distinct, white, centre spots; an irregular, nearly reniform-shaped bulge on lesser half of exterior margin, resting with its point on apex of inner margin, with a white centre spot. The nerves of anterior edge of median disc tinged in black and resting on them a small, irregular, black discal spot. Secondaries of the same rose color, irregularly triangular shaped, and more drawn out towards apex; about one-third the size of primaries, margined with black and containing irregular, small, white, centre spots on anal margin. From base to apex a straight, semi-transparent fold or groove through wing, dividing it, as it were, in two fields; upper edge of fold slightly tinged with a black line, which becomes more prominent and irregular at conjunction with apical margin; centre line of this so-called groove of whitish tinge; beneath the same markings as above. Expanse of primaries 1⅛ inch. Expanse of secondaries ½ inch. Length of body ¼ inch.

Habitat.—Plantation Jagey, southeast Cuba.

This gorgeous *Syntomid*, resembling the Zygænid genus *Metrophila* of South America, was discovered by Dr. J. Gundlach about three years ago. He has graciously left to me the task of describing it, and I thought it only a small token of my gratitude towards a life-long tutor and friend, to call it after him.

Paris, Feb. 9, 1890.

DEAR SIR:—Having had an opportunity of examining an original type of Zeller's *Pempelia petrella*, Isis 1846, p. 771, and 1848, p. 886; V. z.-b. Ges. 1872, p. 545 (99), I find it is the same species described by Walker under the name of *Trachonitis erectalis*, so that this latter name must give way to Zeller's.

To the Catalogue of N. A. Species I add *Myelois grossipunctella* Rag., a very interesting species submitted to me by Mr. C. V. Riley, who informed me that the larva has been detected in California living predaceously on the "fluted scale," or "cottony cushion-scale" (*Icerya purchasi*), adding that it has probably been introduced from Australia. I described the species from a specimen in Guenée's collection which bore no indication of origin.

Yours truly,

E. RAGONOT.

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 13, vol. vi.)

LEPTURINI.

This tribe contains a great number of species which occur on flowers, and are usually prettily colored and clothed with fine pubescence. The charcters in which they agree are those of the fourth division of Cerambycinæ, stated in our last paper and the following: palpi always unequal, the maxillary elongated; mandibles flat, acute, and fringed on the inner margin; legs slender and never very short. Three divisions may be first made.

First joint of hind tarsi with the usual brush of hair beneath (except in certain Acmæops); prothorax usually armed, or tuberculate at sides.
  Prosternum prominent between the coxæ; antennæ short, thickened externally . . . . **Rhagium.**
  Prosternum not prominent, front coxæ conical, protuberant; head not suddenly constricted behind; antennæ slender . . . . **Toxoti.**
First joint of hind tarsi without brush-like sole; prosternum not prominent; head strongly and suddenly constricted behind; eyes finely granulated, deeply emarginate; antennæ slender . . . . . . **Lepturæ.**

RHAGIUM Fabricius.

R. lineatus Oliv., Ent. iv, 69, p. 13, t. 3, fig. 22; Hald., Trans. Am. Phil. x, p. 58; Harris, Ins. Mass., p. 93, etc.

Length 13—20 mm. = .54—.80 inch. *Habitat.*—Sitka; N. Y., Va., N. C., Mass., Mich., Me., Md., La., Pa., Lake Sup., N. Mex., Or., Vanc., Idaho, Can., Ft. Simpson, Mackenzie River.

An abundant and peculiar species. The antennæ are not as long as head and thorax together, and the fifth and following joints are decidedly stouter. The thorax is strongly and acutely armed at the sides and bears a discoidal smooth space. The elytra bear three smooth, strongly elevated costæ. Color black, or partly brown, mottled with lighter pubescence.

TOXOTI.

Eyes large, coarsely granulated; spurs terminal . . . . . . **Centrodera.**
Eyes smaller, coarsely granulated; spurs terminal . . . . . . **Xylosteus.**
Eyes variable; tibial spurs not terminal . . . . **Toxotus.**
Eyes finely granulated; tibial spurs terminal.
  Prothorax acutely armed on the sides.
    Eyes moderate, feebly emarginate . . . . **Pachyta.**
    Eyes large, strongly emarginate . . . . **Anthophylax.**
    Eyes very small, entire . . . . **Piodes.**
  Prothorax obtusely angulated, or rounded on the sides; eyes small, entire.
    Mesosternum not protuberant . . . . **Acmæops.**
    Mesosternum protuberant . . . . **Gaurotes.**

The above arrangement of genera is copied from the "Classification."

CENTRODERA LeConte.

Prothoracic tubercle acute.
  Elytra unicolorous, truncate at tip . . . . **decolorata.**
  Elytra irregularly vittate and blotched; rounded, and slightly dehiscent at tip . . . . **picta.**
Prothoracic tubercle obtuse
  Elytral pubescence arranged in lines . . . . **sublineata.**
  Elytra uniformly pubescent . . . . **nevadica.**

C. decolorata Harris, Injur. Ins. 1841, p. 93; Lec., J. A. P. ser. 2, 1 p. 325; *rubida*, Hald., Trans. Am. Phil. x, p. 58; Proc. Ac. Phil. iv, p. 373.
Length 27½ mm. = 1.10 inch. *Habitat.*—N. Y., Mich., Can., Mass.

Eyes very prominent; antennæ about as long as the body; prothorax constricted and much narrower before the tubercle than behind, channelled longitudinally on the disc; elytra at base nearly twice as wide as thorax, slightly narrower posteriorly, coarsely punctured, confluently near base and more finely towards tip. The insect is entirely rufotestaceous, very sparsely pubescent.

C. picta Hald., Trans. Am. Phil. x, 1847, p. 58.
Length 13 mm. = .52 inch. *Habitat.*—N. Y., Pa., S. C.

Easily known by the smaller size and elytral coloring, which is not caused by pubescence, but lies in the elytra. The antennæ are extremely slender, the thorax elongate, scarcely narrower in front than behind, and the elytra are decidedly narrowed towards tip and slightly sinuate behind the humeri. The pubescence is nearly as sparse as in the preceding.

C. sublineata Lec., Proc. Ac. Phil., 1862, p. 40.
Length 14 mm. = .56 inch. *Habitat.*—N. C., Pa.

The pubescence is more abundant, and so arranged on the elytra, which are very faintly costate, as to give the appearance of lines. Prothorax with tubercle not prominent, somewhat obtuse, narrower in front and bearing a sharply-defined, median channel. Antennæ longer than the body ♂, less slender than in preceding. Color dark piceous.

C. nevadica Lec., S. M. C. No. 264, p. 205.
Length 17 mm. = .68 inch. *Habitat.*—Nev.

"By the obtuse tubercles of the prothorax this species resembles *C. sublineata*, but the punctuation is finer, the prothorax is scarcely narrower at tip than at base, and there is no appearance of lines on the elytra." (Lec.) Color, fusco-testaceous.

XYLOSTEUS Frivald.

X. ornatus Lec., S. M. C.,No. 264, p. 205.
Length 14 mm. = .56 inch. *Habitat.*—Oregon.

Black, head and thorax densely, elytra more strongly punctured, each with two yellow marginal spots. The antennæ are about three-fourths the length of the body (♀). The elytral spots are transverse and directed towards each other in a diagonal direction, and extend nearly one-half the breadth of the elytra. The genus is hardly distinct from *Centrodera.*

TOXOTUS Seaville.

This genus is sharply defined by the spurs of the hind tibiæ, which are inserted at the base of a deep excavation instead of (as usual) at the extreme end. The species are quite similar in form, and all of considerable size. The thorax is constricted before and behind, and tuberculate at the sides; the tubercle varies from a large acute process in *Schaumii*, to an obtusely rounded, scarcely evident form in *obtusus*. The elytra are sinuate at anterior third (not strongly in *cinnamopterus*), and are usually obliquely truncate at tip. The differences between the sexes are often quite marked, besides the greater length of the antennæ in ♂. In *Schaumii* the ♀ is very much larger, and in *vittiger*, *virgatus*, *vestitus* and *obtusus*, the abdomen is ferruginous in ♂, and wholly or partly dusky in ♀. The species may be separated by the following table, which has been corrected by Dr. Horn:

Synoptic Table of Toxotus.

Elytra at apex obliquely truncate.
  Third joint of antennæ very decidedly longer than fourth.
    Elytra unicolorous, black; body either yellow, or black; legs bicolored. **Schaumii.**
    Elytra rufo-testaceous, often varying to black; legs unicolored.
      Eyes larger and more coarsely granulated; elytra not at all costate. **cinnamopterus.**
      Eyes smaller and less coarsely granulated; elytra vaguely costate. **vestitus.**
    Elytra bicolored, vittate.
      Black, with basal, lateral and apical margins broadly rufo-testaceous; legs pale . . . . **nubifer.**
      Black, with marginal and discal vittæ yellow.
        Discal vitta not reaching apex; species of larger size and robust facies. **flavolineatus.**
        Discal vitta entire; species smaller and of slender facies . **trivittatus.**
      Rufo-testaceous, with sutural and discal black lines enclosing broad, golden, pubescent vitta . . . . **virgatus.**

Third joint of antennæ very little longer than fourth; elytra unicolorous, black, varying to rufotestaceous; apex obliquely emarginate and subbidentate . . . . **cylindricollis.**

Elytra at apex obtusely rounded; disc not costate and scarcely pubescent. **obtusus.**

T. Schaumii Lec., J. A. P. 1850, p. 320; Proc. Ac. Phil. 1862, p. 41.

Length 19 mm. = .76 inch. ♂; 25 mm. = 1.00 inch. ♀. *Habitat.*—Ohio, Ill., Vt., Can.

Entirely black, finely pubescent, except the central part of femora yellow. The elytra finely costate, and the black color shading into blue from the dense pubescence; var. *croceus*. Differs ♂ and ♀ in the color of the body, which is yellow, except the tibiæ, tarsi and antennæ, from second joint outwards, which are black as usual. I have this form from Vermont (Mr. Roberts) and northern Illinois, where Mr. George P. Welles has taken it abundantly with the black *Schaumii*. Dr. LeConte mentions (Proc. Ac. Phil. 1862) that the male is frequently yellow, but the yellow female appears to have been unknown to him.

T. cinnamopterus Rand., Bost. Jour. II, 1838, p. 45; *æsculi* Hald., Trans. Am. Phil. 1847, x, p. 59.

Length 10—13 mm. = .40—.50 inch. *Hab.*—N. C., Ill., Mass., Pa.

Uniform pale fulvous in color, thorax darker, eyes large and black. Elytra silky pubescent. The ♂ is smaller, and the antennæ are slightly longer than in ♀.

T. vestitus Hald., l. c.

Length 10—15 mm. = .40—.60 inch. *Hab.*—Oreg., Cal., Vanc.

This species varies considerably in color, being rufo-testaceous, with legs of the same color, or with the legs darker; or it may be entirely black. The legs appear to be always black in black specimens, and the head and prothorax are usually black. The elytra are vaguely costate, and the pubescence, especially between the costæ, is arranged transversely.

Var. *ater:* I suggest the use of this name to distinguish the form, which is entirely black.

T. nubifer Lec., Proc. Ac. Phil. 1859, p. 80.

Length 17.5 mm. = .70 inch. *Hab.*—Tejon, Cal.

This species I have not seen, and am indebted to Dr. Horn and to Dr. LeConte's description for the characters used in the table. The original description is: "Head black, punctate; thorax black, finely punctate, constricted before and behind with a large, obtuse, lateral tubercle; elytra with prominent humeri, gradually narrowed behind; apex obliquely truncate inward; densely, but finely punctate and rugose, blackish, with basal, lateral and apical margin rufo-piceous; beneath black; abdomen, antennæ, palpi and legs rufo-piceous."

T. flavolineatus Lec., Proc. Ac. Phil. 1854, p. 18; Ent. Rep. 1857, p. 63.
Length 25 mm. = 1.00 inch. *Hab.*—Cal.

This species should be easily recognized by the size and characters of the table. The discal vitta (*fide* Lec.) is abbreviated in front.

T. trivittatus Say, J. A. P. III, p. 422, 1823; Bland, Proc. Ent. Soc. I, 1862, p. 270; *vittiger* Rand., 1838, l. c. p. 29; *nigripes* Hald., l. c.
Length 15—17 mm. = .60—.68 inch. *Hab.*—Can., Me., N. Y., Pa., N. Ill., Miss.

This species has been known in collections generally under Randall's name *vittiger*, but Say's date is fifteen years earlier. The differences between the two have been summarized by Randall and Bland as follows: *vittiger*, ground color black, third joint of antennæ longer than fifth; *trivittatus*, ground color reddish yellow, third joint of antennæ about equal to fifth. Both characters are found to vary in other species, and *fide* Dr. Horn there is only one species.

T. virgatus Lec., Trans. Am. Ent. Soc. v, p. 67.
Length .16 mm. = .64 inch. *Hab.*—Mont., Or., Vanc., British Columbia.

This species resembles *vestitus* in the arrangement of the elytral pubescence, but differs by the black discal lines, between which the pubescence is very abundant and often golden in color, making it a very pretty insect. The discoidal vitta is narrower than in *vittiger*, and does not descend to the inflexed portion.

T. cylindricollis Say, J. A. P. III, 1823, p. 417; *atratus* Hald., l. c.; *dentipennis* Hald., l. c.; Dej., Cat. 3 ed., p. 380; *dives* Newn., Ent. p. 68; *sericeus* Knoch., in litt.
Length 22 mm. = .88 inch. *Hab.*—Pa., Ga., N. Y., Ill., Can., Ill., Ala., Miss.

Rufous, elytra and tarsi darker. The tips of the elytra are obliquely truncate, and the angles produced, subbidentate.

T. obtusus Lec., S. M. C. No. 264, 1873, p. 206.
Length 15 mm. = .60 inch. *Hab.*—Yellowstone Basin.

Dr. LeConte's description says "differs from all the other species before me by the less deeply constricted prothorax and more obtusely rounded lateral tubercles; the eyes are smaller than usual and finely granulated, but more convex than in *vestitus*, with which it agrees in this character; the third and fifth joints of the antennæ are equal, and the fourth joint is two-thirds as long. The pubescence is extremely short and fine."

(To be continued.)

A Melanic Argynnis Bellona.

BY F. J. SCHMITT.

A strongly-marked, melanic *Argynnis bellona* was captured here during the last collecting season, and a description of it is herewith given.

It differs from the normal form in these particulars: The basal two-thirds of fore wings, upper and lower side, and upper side of hind wings are black. There are a few scattered, fulvous scales at the base of fore wings; on lower side they are slightly more numerous. The outer third is fulvous, but on the fore wings this is much sooted with black scales, especially towards the apex. The terminal are confluent with the subterminal spots, forming a row of five, oblong marks. The veinlets terminate in oval, black blotches. On the under side of the fore wings the fulvous outer third is very strongly tinged with rusty brown, and the oval, terminal spots of above are indistinct. On the hind wings the black of basal two-thirds extends also narrowly along the veinlets to the outer margin; a very distinctive feature. The terminal lunules are wanting, and the subterminal spots diffuse. In the black a very slender streak of fulvous scales indicates the position of the small vein closing the cell. The lower side of the hind wings has no black, but differs from the normal form by the absence of the usual bands, markings, or spots. Taken Sept. 11, 1889.

St. Vincent College, Pa.

Note on the season of *Pleocoma behrensii* Lec.—Upon the 19th, 20th and 22d of October, last, and while the second period of heavy rain was at its height, I went forth in search of *Pleocoma*, and on each of the above dates I was successful. I continued the search up to the 27th of the same month, when I relinquished the pursuit, not having met with a *Pleocoma* after the above-named dates. To-day, the 19th of February, just four months after the first capture of the season, a perfect, living ♀ was brought to me, it having been dug out of a bank of black adobe.—J. J. RIVERS, University of Calif.

Herr Johann Fruhstorfer, a young German naturalist of Berlin, has spent considerable time in collecting during the past year in Ceylon. He was assisted by fourteen other collectors, Germans and natives, and has succeeded in amassing a collection of insects which he estimates as containing 25,000 Coleoptera, 7000 Lepidoptera, 3000 Orthoptera, a like number of Neuroptera, and a thousand of spiders and centipedes. He has also collected in Brazil and Malacca, and in May expects to visit Java and Borneo. Many specimens of his collecting will doubtless find a repository in German museums. F. H. C.

DESCRIPTION OF A NEW CYCHRUS.

BY J. J. RIVERS.

C. fuchsianus Rivers.—Form and general aspect of a large *ventricosus*. Piceous black, moderately shining. Head moderately elongate, more or less transversely wrinkled, a slight impression at middle of clypeal margin, lateral ridge of genæ rather deeply notched. Thorax cordate, or little wider than long, deeply sinuate posteriorly, hind angles rectangular, median line distincty impressed, apical impression moderate, basal transverse impression deep, longitudinal impressions feeble, surface finely transversely wrinkled. Elytra oval, more broadly in the female, striate, striæ closely punctured, the alternate intervals wider and with punctures as coarse as the striæ, intermediate intervals impunctate, inflexed portion of elytra rather coarsely, not deeply punctured. Body beneath smooth, shining. Length .85—1.00 inch.; 21.5—25 inch.

The male has the first three joints of the anterior tarsi papillose beneath as usual in the *ventricosus* group.

Closely related to *ventricosus*, but differs in the elytral sculpture. The intervals in the latter species are equal and smooth; in this new species are alternately wider, and the wide intervals are alone punctate. At the sides the striæ are so confused in the present species as to render it impossible to count those on the outer third, while in *ventricosus* the striæ may be easily enumerated.

For some years I have had the ♀ of this insect in my collection as an undescribed species, but thought it allied to *striatopunctatus* by the alternating of the punctured intervals, but Mr. Charles Fuchs having recently received three examples from Sonoma County, two of which are males, I have been enabled to find its true position. With the aid of Horn's* "Synopsis of the species of *Cychrus* inhabiting Boreal America," it is evident, by the three papillose tarsal joints that it belongs to the subgenus *Brennus* of Mots., and should be placed next after *C. ventricosus* Dej., as the two forms have many characters in common.

Occurs in Eldorado and Sonoma Counties, Cal.

The above description having been sent me by Mr. Rivers for publication, I avail myself of the opportunity to make known a second species.

GEO. H. HORN, M. D.

C. merkelii Horn.—Form and general appearance of *canadensis*, piceous-black shining, elytra with distinct cupreo-violaceous lustre. Head and thorax smooth, the latter cordate, a little broader than long, sides arcuate in front, oblique posteriorly, hind angles very obtuse, disc slightly convex, apical transverse impression faint, median line deeply impressed between the apical and transverse basal line, the latter faint, longitudinal impressions of the angles short and shallow. Elytra oval, one-fourth longer than wide, disc slightly flattened, deeply striate, punctuation indistinct, not crenate, intervals convex, smooth. Body beneath piceous-black, smooth, shining. Length .43 inch.; 11 mm.

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* Trans. Amer. Ent. Soc. VII, December, 1878.

This species belongs to the *Sphærroderus* group, and is allied to *stenostomus* and *canadensis*. The thorax is, relatively to the elytra, smaller than in either of the above species, and more narrowed at base, and differs especially in having the basal impressions faint and short and absolutely without punctures. Its form is more slender than either of the above-named species, and is not unlike *Nomaretus bilobus*.

One female specimen obtained from northern Idaho, and kindly given me by Mr. Aug. Merkel, whose name I attach to it in recognition of many favors.

NOTES AND NEWS.

Even old scientists will commit indiscretions. Our old and venerable friend, Dr. Ivan Gundlach, having persisted in wading through the malarious swamps in the vicinity of the Aguadore River, southeast Cuba, to discover new wonders, has paid the tribute of human frailty. He has contracted a severe laryngial affection and been ordered back to Havana by the physicians of Santiago. We wish our friend, who will celebrate his 80th birthday next July, a speedy recovery.

From Tatsienlou, Thibet, the mountain abode of the renowned Abbé David, from whom Mr. Oberthür received years ago those wonderful lepidoptera described in his "Etudes Entomologiques," I receive shipments now by way of Europe. Many of the insects are entirely new to science, and I shall refer to them in these columns in the course of time.

Capt. Yankowsky has started on an extended tour up the Yang-tse-Kiang River, Central China, and will go through western Sze-chuen and Mount Oune, territories never before visited by any collector. I have a share in the expedition, and hope for great spoils.

The rare *Smerinthus çerysii* and *Platarctia parthenos* have been, last season, raised from the egg, and Prof. Braun will shortly publish their life-history.

The last two volumes of the "Butterflies of Japan," by the late Mr. Pryer, have just been published by the estate, and show what an ardent and thorough-going scientist this gentleman was.

B. Neumoegen.

Preparatory Stages of Arachnis picta Packard.

BY HARRISON G. DYAR.

EGG.—Spherical, the base slightly more flattened than the summit. Color light pearly gray. Diameter about 1 mm. The eggs are laid in masses of fifty or less, close together, but only in a single layer. About four hundred eggs are laid by one female. The duration of this stage is about two weeks.

FIRST LARVAL STAGE.—When newly hatched, the head is slightly cordate, black and shiny, the mouth pale. A few black hairs on its surface; cervical spot straight in front, curved behind, black and shiny as the head. The body is pale, dirty whitish, with long black hairs growing from blackish warts, which are arranged as in the mature larva. Thoracic legs black. Length 2 mm. After hatching, the little larva makes its first meal of its egg-shell, which it sometimes completely devours. As the stage progresses the body becomes greenish white, the warts black, some of them brownish at their bases forming a subdorsal and substigmatal brown band on the middle segments. Legs black.

SECOND LARVAL STAGE.—Head as before. Body pale whitish, the warts large and black, with brown irrorations between those in the subdorsal and subventral spaces. Thoracic feet black; abdominal black outwardly. Hair black, about 1 mm. long. Length of larva about 4 mm.

THIRD LARVAL STAGE.—Head shiny black. Body and warts black, with a white dorsal line and pale stigmatal band. Hairs black, whitish from the warts in subventral space. Length 6 mm. As this stage approaches completion the body assumes a purplish black color, and the lines are yellowish.

FOURTH LARVAL STAGE.—Head black and shiny, with a few short black hairs. A paler line above the mouth concolorous with the base of the palpi. Body and warts black, a narrow, dull, whitish dorsal line. Hair bristly and black, paler from the warts in subventral space. Feet shiny black, the claspers of the abdominal, paler. Length 9 mm.

FIFTH LARVAL STAGE.—Head as before. Body black, dorsal line whitish, narrow and faint. Hair very bristly, black, but mixed with brown hairs, especially from the lower warts. Length .13 mm.

SIXTH LARVAL STAGE.—Head black, the mouth slightly paler, a few hairs about the mouth. Body black, with a trace of dorsal line. Abdominal legs reddish. Hair black, mixed with brown. Length 20 mm.

Seventh Larval Stage.—Head as before, but on the vertex posteriorly is a paler patch; cervical spot black, bisected. Body black, a mere trace of dorsal line on the first few segments; the warts are brownish, and spiracles dirty white, otherwise as before. Length 30 mm.

Eighth Larval Stage.—Mature larva. Head pale brown, but largely black in front. Mouth brownish, but the ends of the jaws black; a few fine, dark hairs. The warts are arranged as follows: (1) a row on joints 5 to 12 in subdorsal space situated anteriorly; (2) subdorsal and (3) superstigmatal row, both replaced on joint 2 by the cervical spot; (4) substigmatal row, the last three coalesced on joint 13 in one large wart; (5) and (6) two rows in the subventral space, there being only one row on joints 2 and 4 situated intermediately, and the lower, slight on joint 13; (7) four small warts on the venter of each of the legless segments. Body black, the warts large and pale brown. Thoracic feet dark brown, the abdominal dull crimson. Spiracles orange. Hair bristly, black, mixed slightly with brown. Length 45 to 50 mm.

The duration of each stage was from eight to ten days. When mature some of the larvæ pupated at once, but others hibernated for the space of three weeks before pupation, although the weather was warm.

Cocoon.—A thin netting of white silk, without any larval hairs, which remain on the cast skin. The silk of the cocoon is strung with little clear drops at the joinings of the threads.

Pupa.—Head small; thorax rounded, a slight depression behind it. Abdomen curved, the ventral and stigmatal sides straight. Two rows of tufts of stout spines on the dorsum of the abdomen, the upper situated anteriorly and the lower posteriorly on the segments, two more rows at the spiracles smaller, and others below only slight; cremaster, two tufts of spiny hairs with their ends minutely hooked. Color, black; thorax and cases shiny and creased. Abdomen dull, covered by a slight bloom, minutely punctured.

Food-Plants.—Probably numerous. The larvæ fed readily on malva, clover, alfalfa, geranium, etc.

Larvæ from Los Angeles County, Cal.

The exertions of various well-known gentlemen point it that we will at last have some active collecting of Lepidoptera done again in these United States. Professional collectors of the type of the late Boll and Morrison, are sadly needed, and would find liberal assistance for good work.

B. Neumoégen.

Descriptions of the Preparatory Stages of Edema albifrons A. and S.

BY WM. BEUTENMULLER.

EGG.—Pale green, subglobose, slightly concave at the base, smooth, shining. Length .80 mm. Width .50 mm. Duration of this stage thirteen days. Laid in small masses on the underside of leaves.

YOUNG LARVA.—Head large, jet-black shiny, with a few white hairs. Body yellow, with two pairs of minute, wart-like elevations on each segment along the dorsal region. The elevated segment is humped and followed by two brown spots. Along each side there is also a series of wart-like elevations which gradually diminish in size towards the posterior part of the body. All the warts bear a short whitish hair. Body beneath concolorous to the above. The feet are white, semi-translucent; as the larva grows older, fine black stripes begin to appear along the dorsal region, and which are broken by the wart-like elevations. Length 2 mm. Duration of this stage seven days.

AFTER FIRST MOULT.—The head now becomes brick-red or yellow, otherwise as in the previous stage. The larva in this moult begins to attack the leaf, while the young larva eats only the parenychma of the leaf. Length 4 mm. Duration of this stage eight days.

AFTER SECOND MOULT.—Between the black stripes along the dorsal region there is now present a canary-yellow stripe, and across the posterior segment is a series of small black spots. The hump is now brick-red. Length 6 mm. Duration of this stage seven days.

AFTER THIRD MOULT.—No difference from that of the previous moult. Length 10 mm. Duration of this stage six days.

AFTER FOURTH MOULT.—Same as the previous one, except somewhat deeper in color and the marking more distinct. Length 17 mm. Duration of this stage five days.

AFTER FIFTH, THE LAST MOULT.—The head is now bright coral-red, as is also the hump on the eleventh segment. Along the dorsal region is a series of six fine black stripes on the whitish ground color, and are broken on the junction of each segment. Along the subdorsum is a rather broad canary-yellow stripe, and along the sides are four black and yellow, or black and white stripes; the black stripes being the finest. The ground color sometimes assumes a pinkish color. Body beneath dirty white with black markings. The thoracic feet are yellow, and the abdominal legs are concolorous with the body. Length 28 mm. Full grown 42 mm. Duration of this stage nine days.

The eggs from which my observations were made were laid on June 19th, and the young larvæ emerged on July 2d. The first moult took place on July 9th, the second moult on July 17th, the third moult on July 24th, the fouth on July 30th, and the last moult on August 4th. The larvæ were full grown on August 12th.

The cocoon is irregularly oval, and is of a tough, sordid white texture, and is spun on the ground amongst leaves. Single brooded.

Food-plants: various species of oaks.

A New Species of Agrotis.

BY JOHN B. SMITH.

Agrotis atristrigata n. sp.

Ashen gray, black powdered; collar with a black, transverse line. Primaries heavily black powdered, all the transverse maculation obsolete. Orbicular elongate, narrow, fused with the small, upright reniform, else all the normal maculation absent. A paler shade runs from the end of the cell to the apex, and veins 3 and 4 are white marked nearly to the margin, lightening that region. The fringes are cut with white; secondaries white, with a broad, soiled, outer margin. Expands 1.20 inches; 30 mm.

Hab.—N. W. British Columbia.

This species has all the structural characters of *Hollemani*, and comes between that species and *biclavis* in the synopsis. The ordinary spots are very small and scarcely distinct. The specimen is a poor one and badly rubbed, and would not have been described, but that it was a ♂, and the affinities were so distinct as to render its recognition certain, should other specimens be turned up.

Among the Noctuæ from Thibet which I received some weeks ago, quite a number prove to be well-known insects of the European fauna, while a few greatly resemble our "American cousins." I shall refer to it in time after having worked up the material on hand.

At the entomological auctions at Stevens', in London, fabulous prices are often realized for rare specimens or showy insects new to science. Some months ago as much as £20 and £30 was paid for *Assam* and *Bhotan arctiidæ*, and the purchasers were happy at that.

A portrait of Prof. S. A. Forbes, fourth State entomologist of Illinois, together with a pen sketch of his life, adorns the Trans. Illinois State Hort. Soc. for the past year.

NEW CALIFORNIA HOMOPTERA.

BY E. P. VAN DUZEE.

(Continued from p. 52, vol. vi.)

5. Thamnotettix subænea n. sp.

Form and size of *T. abietina* Fall. Broad. Pale yellow, obscurely marked with fulvous. Elytra subhyaline, veined and marked toward the costa with fulvous brown and exhibiting by oblique, light, strong, coppery reflections, intensified by the highly iridescent wings beneath; lower surface pale testaceous. Length: male, 6.5 mm.; female, 7 mm.

Head a little wider than the pronotum; very bluntly rounded; vertex about one and one-half times as long medially as next the eye, disc flattish, with a transverse depression behind the tip; a central line connecting before with a transverse spot on the depression, and two irregular spots on the hind border near the eyes, pale fulvous. Sometimes the latter spots are divided; and there may be two small points near the apex. Front broad above, occasionally with a few short, pale brown lines each side; sutures of the face more or less embrowned. Loræ broad. Clypeus slightly widened at the rounded tip. Antennal seta rather long. Eyes brown. Pronotum: anterior margin straight; sides very short, with a black spot below the edge; latero-posterior margins straight, the angles rounded. Surface pale, with six short, fulvous stripes not reaching either margin, the lateral ones frequently obsolete, scutellum pale, basal angles, two dots between them and the central line, a little dusky in fully colored examples; edge whitish, with two black dots on each side. Beneath and legs pale or soiled white; femora lineate with pale brown; tibiæ with black dots at the base of the spines. Elytra pale fulvous, almost hyaline, infuscated toward the suture, where there is a brown stripe, sometimes only indicated on the base and apex of the clavus; an indistinct whitish band crosses the elytra near the middle, strongly distinguished on the suture near the tip of the clavus; nervures copper colored, at the apex margined with brown. The whole surface has a coppery reflection, almost iridescent in some lights, produced, in part at least, by the highly iridescent wings beneath. Nervures of the wings brown. Abdomen pale testaceous, with a black line on the venter at each side next the base of the connexivum, sometimes broken into spots; margin of the dorsal segments broadly black, or at least with a black spot at the posterior angle.

Last ventral segment of the female about three times as wide as the preceding, broadly rounded posteriorly, with a prominent central tooth; pygofers with marginal and a few discal pale bristles. Ultimate ventral segment of the male not differing from the penultimate; valve broad and short, rounded, with two black spots on the base, the plates fringed with white hairs.

Described from two females and one male (No. 223). This insect might readily be mistaken for a *Scaphoideus*, but the antennæ are shorter, and in general characters it agrees most nearly with the present genus, in which I have placed it provisionally.

6. Thamnotettix coquilletti n. sp.

Form of *T. kennicotti* Uhl. nearly. Pale yellow marked with fulvous, female; or whitish testaceous, marked with fulvous brown, male. Eyes, two spots on the front of the vertex, and the basal angles of the scutellum black. Length: male, 4 mm.; female, 5 mm.

Head as wide as the pronotum, female; or a very little wider, male; obtusely rounded before. Vertex narrow, the fore and hind margins almost parallel; surface sloping anteriorly, passage to the front well rounded. Front rather wide; sutures above the antennæ parallel, below converging to the clypeus. Clypeus long and narrow, the rounded apex exceeding slightly the cheeks. Loræ narrow, somewhat elongated. Cheeks narrow, sides feebly angled just below the eye; first two joints of the antennæ thick, poorly distinguished, the first much narrowed at base. Legs: first joint of the anterior tarsi broad, of the posterior somewhat elongated. Posterior margin of the pronotum almost straight, lateral angles rounded. Neuration of the elytra as in our other species of *Thamnotettix*, except that the transverse nervure connecting the first and second sectors runs obliquely forward and inward.

Color: Male.—Head pale yellow; vertex tinged with fulvous against the eyes, and with a fulvous spot at the apex; immediately above each ocellus is a large, round, black dot; sutures of the front and clypeus from the antennæ to the tip of the loræ heavily lined with black; front above with two triangular brown spots converging to a fulvous point on the tip of the vertex, and diverging below, where they are interrupted by some pale, transverse, broken lines. Eyes and antennal setæ brown. Pronotum whitish testaceous, with a transverse, fulvous brown band within the posterior margin, interrupted at the middle by a longitudinal white line, which is broadly bordered with brown, especially on the anterior margin. Scutellum pale yellow, with an oval black spot within the basal angles. Elytra fulvous brown; costal half of the corium hyaline almost to the apex; nervures slender, white, except at the apex, and broadly bordered with the same color on the clavus and inner half of the corium. Wings hyaline, smoky toward the tip, nervures thick, brown; pectoral pieces white, edged with black; sternum black. Legs white, base of all the spines with dark brown points; joints of the posterior tarsi embrowned beneath toward their apex; tip of the rostrum and the pulvilli black. Abdomen black; connexivum, disc of the venter and genitalia white.

Female.—Obscure pale yellow, elytra whitish; markings as in the male, but paler; face immaculate, or with faint indications of the superior brown spots; cheeks with a dusky cloud below the eye; black spots on the vertex distinct; fulvous markings on the pronotum more extended along the anterior margin. Abdomen and all beneath soiled white, immaculate or nearly so. Wings white, slightly iridescent, nervures inconspicuous.

Genital pieces.—Male: valve broad, occupying the concavity of the hind margin of the ultimate ventral segment, its posterior edge feebly convex; plates broad, triangular, sides slightly convex, apex obtuse, edge fringed with stout bristles.

Female.—Last ventral segment long, the edge nearly straight, with a minute central notch; pygofers short and broad, apex truncate, the apical submargin with a single row of stout spines, the sutural margin with a few short ones scattered along nearly its whole length. Ovipositor slightly exceeding the pygofers.

Described from one male (No. 626) and two female (No. 331) examples. This species is somewhat anomalous in the genus in which I have placed it. In form, and especially ornamentation, it corresponds very closely with an undescribed Jassid found abundantly on willows in New York, that I have placed in *Calliscarta*, but this latter form has the elytral venation of *Cicadula*, while the present species agrees in this respect with *Thamnotettix*, where I prefer to place it for the present. This is one of those not uncommon cases where a species exists apparently for the sole purpose of puzzling the entomologist and showing him how little Nature appreciates his laboriously-founded and nicely-discriminated genera.

It affords me pleasure to dedicate this neat little Jassid to its discoverer, who is too well known to require words of commendation from me, else freely given.

7 Thamnotettix geminata n. sp.

Form of *Cicadula* 6-*notata* Fall., but larger. Dull green or greenish brown. Head yellowish white; anterior edge of the vertex with four large black spots; disc of the scutellum with two small, approximate, black points. Length 4.5 mm.

Head hardly as wide as the pronotum; obtusely rounded before, finely punctured. Vertex about one-fourth longer at the centre than next the eye, base with a fine impressed line. Sides of the front almost straight, slightly incurved toward the apex. Clypeus narrow, widened toward the obtusely rounded apex. Cheeks obscurely angled below the eyes. Pronotum scarcely angled at the sides, the posterior margin straight; surface with fine, transverse striæ and distant, scattering punctures. Basal ventral segment broad, posterior edge arcuated.

Color: Head yellowish white, tinged with fulvous on the disc of the vertex and around the eyes; short impressed line on the vertex and sutures of the front black; a large black spot occupies the apex of the head each side of the tip, and there is another on the margin of the vertex immediately behind each ocellus; antennal cavity and a few faint, transverse lines on the front black. Antennæ pale. Eyes black; pronotum dull greenish brown; behind the anterior margin is a black, wavy line, which becomes obsolete before reaching the lateral angles. Propleura sulphur-yellow, the other pleural pieces yellow on their outer half, their discal half and the sternal pieces black. Scutellum greenish yellow; transverse impressed line, two approximate black points before it, and a small triangle somewhat remote from each basal angle black. Elytra brownish hyaline, obscured toward the sutural margin; nervures slender, but distinct, pale, embrowned toward the apex. Wings hyaline, iridescent, nervures fuscous. Abdomen black, connexivum yellow. Legs pale whitish yellow; posterior tibiæ with a black line on the inner edge, their tarsal joints touched with brown. Last ventral segment and pygofers soiled white, the latter suffused with ferruginous.

Last ventral segment longer than the penultimate; posterior margin produced in a short angle each side of the middle, where there is a shallow incision on either side of the short, blunt central tooth; pygofers broad, abruptly reaching the end of the ovipositor.

Described from a single female example (No. 616). This species has much the appearance of a *Cicadula*, in which genus it might readily be placed, but for the characteristic venation of the elytra.

8. Thamnotettix flavocapitata n. sp.

Form of *T. cruentata* Panz. Pale yellow; head sulphur-yellow; elytra fulvous brown ♀, or olive-brown ♂; costa pale. Length: male, 5 mm.; female 5.5 mm.

Male; Head as wide as the pronotum, posterior margin regularly concave, anterior obtusely triangular. Vertex one-half longer at the middle than at the eye; passage to the front rounded. Front narrow, the sides almost straight. Clypeus widened toward the apex, which is truncated, and does not surpass the cheeks. Outer edge of the cheeks but feebly arcuated above, leaving a rather broad margin on the outer inferior side of the eye. Pronotum about one and one-half times as long as the vertex; hind edge scarcely concave; sides short, the angles rounded.

Color: Head sulphur-yellow, sometimes tinged with fulvous on the vertex; antennal setæ brown, eyes olive-brown. Pronotum olive-brown, paler on the anterior margin, behind which is a fine concentric line usually more or less obsolete. Beneath and legs pale yellow or whitish; propleura sulphur-yellow; tips of the tarsal joints and claws brown. Scutellum ferruginous brown, the transverse impressed line blackish. Elytra olive-brown or fuscous, subhyaline, with more or less distinct coppery reflections; costal half of the corium whitish hyaline; discal nervures pale yellow, indistinct, the costal clearer yellow; nervures of the clavus with a whitish spot next the suture. Wings whitish hyaline, highly iridescent; nervures thick, fuscous. Tergum black, broad, lateral and narrow posterior margins of the segments yellow. Venter yellow, base of the connexivum and of the first ventral segment black. Genitalia black; valves and plates yellow, the former with a dusky spot at base.

Genital pieces: Valve transverse; almost quadrangular, but with the outer corners well rounded. Plates triangular, sides well rounded toward the base, extreme tip a little produced; edges heavily fringed with long, soft hairs. Margin of the pygofers oblique, leaving the short, stout hooks at the inner acute apex of the triangular-ovate orifice; margin and apex armed with ten to fifteen stout bristles. Slender tips of the styles projecting conspicuously beyond the apex of the plates.

Female.—Pronotum, scutellum and elytra fulvous brown; nervures of the wings pale brown; abdomen yellow, disc of the tergum brown. The colors are paler than in the male, and the vertex is proportionately shorter and broader. Last ventral segment long; the rounded end with a broad notch including a prominent central tooth; pygofers a very little shorter than the ovipositor; at their base beset with rather short white bristles.

Described from six males (No. 601) and three females (No. 154).

(To be continued.)

ERRATA.

By a misunderstanding the 16-page form was printed before final proof was in, and the following escaped correction:

Page 63, line 6, for **Spningicampa** *read* **Sphingicampa.**
" 65, " 3, of article, for charcters *read* characters.
" 67, " 10, for Seaville *read* Serville.
" 68, " 3, for subbidentate *read* sub-bidentate.
" 69, " 31, for " " "
" 71, " 7, for distincty *read* distinctly.
" 72, " 18, for Ivan *read* Juan.
" 76, " 4, for fouth *read* fourth.
" 76, " 4 from bottom, for *arctiidæ* read *Arctiidæ*.
" 76, of the three short notes the first two should be credited to B. Neumoegen, the third to F. H. C.

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Insects for identification, or as donations to the collection of the Society, go to either of the curators.

ENTOMOLOGICA AMERICANA

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On the Probable Pollenization of Greenhouse Chryanthemums by Eristalis tenax.

BY JOHN HAMILTON, M. D.

In many of the greenhouses throughout the United States, where Chrysanthemums are anywise extensively grown, a Dipteron, known to the proprietors as the Chrysanthemum fly or bee, makes its appearance early in October on the disclosing of the first flowers and continuing as long as the Chrysanthemums are in bloom. Its appearance and actions so greatly resemble those of the honey bee as to pointedly exemplify a mimicry that is all protective. I first observed it five years ago, in considerable numbers, on the large collection of Chrysanthemums in the greenhouses of the Allegheny parks; in many respects it acted very bee-like, hovering over the flowers till a selection was made, then alighting and burying itself among the petals, it would work among them diligently for a time and then fly away to another. From Mr. William Hamilton, the learned superintendent, I obtained the information that this fly was reputed to pollenize Chrysanthemums, and that this knowledge had been utilized by certain growers of seed, though he himself had never experimented to obtain any in that way. The fly does not meddle with any of the other flowers in the greenhouse, however fragrant, nor has it been seen outside by any of the operatives, nor by myself.

Mr. John Thorpe, of Pearl River, N. Y., a learned and distinguished florist, who makes a specialty of Chrysanthemums, to whom I wrote for information, courteously states that he has not noticed it outside his greenhouses at any time, and neither has he seen it until the first Chrysanthemums are in bloom, the date varying from October 5th to 13th, in six years; and further says, "I am sure they assist in the pollenization of the flowers, as I have watched them working many hours; *Eristalis tenax* is the name it received from an entomological friend.''

Reports from other sources are to the same effect, but no one has yet volunteered the statement that of his own knowledge seed has been so obtained, and it has been considered indelicate to put the question directly to the producers of this precious commodity; an experiment, however, would be no way difficult.

Eristalis tenax is an inhabitant of the old world, and accommodates itself to all climates from the Arctic regions of Siberia to the tropics in Africa, probably originating in Japan, the metropolis of Chrysanthemums. The knowledge of its existence in N. America dates back no further than 1875, when Baron Osten Sacken took a single specimen at Cambridge, Mass., after having collected Diptera throughout the United States, and yet, in 1884, it was known from nearly all parts of the country, from Massachusetts to Georgia, and westward to Washington. (Psyche ii, 188 and 260; Can. Ent. xiii, 176; Trans. Ent. Soc. London, 1884, p. 489–96). In the last cited article Baron Osten-Sacken, speculating on the mode of its introduction into North America, and its sudden appearance all over the country, states the only two possible ways. First, by introduction through the Atlantic seaboards; he fails, however, to inform us how this insect was likely to have been so extensively distributed in eight or nine years. Second, as being indigenous to Western, but not to Eastern America, it slowly worked its way across the Rocky Mountains eastward to Missouri, where, meeting with more favorable conditions, like *Doryphora decemlineata*, it suddenly spread to the Atlantic, where it was soon recognized by entomologists; but what these conditions were is not indicated.

Now, we may have it from both sources, as it is indigenous in Kamtschatka it may also be in Western North America, like so many other insects. And we may likewise have it by introduction, and if it really escaped commercial transportation, though seemingly strange considering its larva and imago habits, till near the time specified, its subsequent rapid and wide distribution is not incredible nor impossible when its relation to Chrysanthemums is considered, the craze for which during the last two decades has spread them to nearly every village and farm house in the United States. In the article cited above from the Can. Ent., Dr. S. W. Williston states that this fly is often found ''in houses early in October.'' Chrysanthemums, probably, might have been found there likewise.

No record of the food-habits of the mature *E. tenax* has been noticed; it cannot, however, be confined to greenhouse Chrysanthemums, as it appears abundantly in early summer; there are, however, near one hundred species of Chrysanthemums distributed throughout the different countries it inhabits which, blooming at various seasons, may supply it with food, and it may have other resources at present unknown.

The larva is one of the rat-tailed maggots, and lives in any kind of compost or mephitic mud, the more horridly fœtid the better; the elastic tail, which is capable of being extended more than two inches to the surface, contains a double air tube, through which the larva breathes. To contrast—the larva revels and fattens in the vilest, most disgusting filth imaginable—the imago disports itself among the fairest bloom and draws sustenance from the loveliest of the lovely.

Under the caption "Drone Fly," Rev. J. G. Wood, "Insects at Home," gives a figure of the imago, and a very charming account of the larva and its habits, from which the foregoing account of the larva is mostly taken.

The mode of life of the imago outside of greenhouses seems to be unrecorded, at least such is the case in any of the American or European literature consulted, a knowledge of which mode is now of great interest, and must enter largely into any future attempt to account for its distribution in America.

REMARKS ON SOME WESTERN TENEBRIONIDÆ.

BY H. F. WICKHAM.

Every collector who has had the pleasure of traveling in that part of our country lying west of the Missouri River, must have noticed the great development of the Tenebrionidæ as regards the number both of species and of individuals. They form, in fact, the most noticeable feature of the Coleopterous fauna of that region, especially towards the South on the table-lands and plains of Texas, New Mexico, Arizona and Southern California.

Offering little variety in color, they differ widely in habits, and their forms are extremely diverse, though most of them have a peculiar *habitus*, which at once marks them as members of this family. Some observations may be of interest to such of our Eastern brethren who have never had an opportunity to study them in life, and in this hope I offer the following notes:

Edrotes ventricosus Lec. Taken at Barstow, Cal., under logs, August 19th. Rare. *E. globosus* Casey is found about the roots of weeds in the middle of May at Greeley, Col.

Triorophus lævis Lec. was taken at Barstow clinging to the under surface of boards which were resting on the sand, August 19th. *Trimitys pruinosa* with *E. globosus*, Greeley, Col.

The species of *Eurymetopon* and *Emmenastes* have all very nearly the same habits so far as I observed, being found chiefly about the roots of various plants, especially such weeds as grow in thick clumps or brushes. Most *Emmenastes* have a very fine bluish "bloom" when living, but this is easily removed, and I never saw a cabinet specimen that showed it. These remarks apply particularly to *Eu. rufipes*, *emarginatum* and *convexicolle*, and *Em. ater*, *acutus*, *obesus* and a *n. sp.*

Epitragus is not so strictly terrestrial as the preceding insects, and is in the habit of climbing up the sage-brush and resting among the leaves, especially in cloudy weather. I noticed large numbers of *E. canaliculatus* in the branches of sage-brush at Seligman, Ariz., one very rainy and disagreeable day in late July. *E. acutus* I took at Albuquerque; *E. plumbeus* at Coolidge, both having the climbing habit.

Batulius setosus may be found in the sand under dry cow-droppings along the Little Colorado River near Holbrook, Ariz., in company with *Aphodius*. It is an "early bird," appearing in April.

Zopherus probably breeds in wood, and my series is interesting as showing the replacement of one species by another at short intervals. At Albuquerque I found *Z. granicollis*, and took it again at Coolidge, one hundred and thirty-six miles farther west. Another one hundred and fifty miles, and it gives place to *Z. elegans;* ninety miles beyond this is replaced by *Z. opacus*, which in turn yields to *gracilis* and *tristis* in the next one hundred miles. They all occur in the immediate vicinity of pine logs, generally resting on the bark of the under surface close to the ground, with the exception of *Z. elegans*, which I took around cottonwoods, there being no pine within several miles, except the ties on the railroad.

Phellopsis var. *porcata* is found on old pine logs, and is very hard to see on account of its brownish color and the peculiar irregularities of the upper surface, which harmonize with the bark of the tree.

The little *Aræoschizus costipennis* is sometimes seen clinging to the underside of boards laid in the sand along the Little Colorado River bottom. Its congener, *A. armatus*, I found living with a large species of ant at Green River, Wyoming, in May. They are rapid runners, but feign death if disturbed.

In the Colorado desert, near the Needles, Cal., we find *Cryptoglossa verrucosa*, a very fine insect. During the heat of the day it remains in concealment under logs, etc., but in the evening may be found running over the ground. I took quite a number of them under some bales of straw which had been left on the river's bank-by railroad hands.

Microschatia inæqualis, is said to be a common species, but I took only one example, at San Diego, under a log.

Asida and its allies furnish a large number of species, some of them very common, and many extremely variable. *Ologlyptus anastomosis* is an interesting form, and is found under logs in the valley of the Little Colorado, in July. *Asida opaca* I took at Albuquerque in clumps of weeds; it lies hidden in the sand at the roots. *A. sordida* was very common at Luna, N. M., and Winslow, Ariz., under logs or at the roots of plants. It is crepuscular in habit and may be seen running around about dark. At Peach Springs I got a few *A. actuosa*, under logs, with three examples of *A. parallela*, late in August. One specimen of *A. confluens* occurred at the Needles on August 21st. *A. convexa* is rather common in New Mexico in August and September, and shows considerable variation in the width of thorax and elytral sculpture. *A. convexicollis* Lec. is another variable species, and the differences between specimens taken at 7000 and at 5000 feet altitude is considerable. In the former the thorax is much broader, the margin wider and more strongly punctured, the disc of the elytra (taken together) more arched, and the surface more coarsely rugose. I should like to consider them as distinct species in fact, but Mr. Linell, to whom I sent specimens, thinks them the same. *A. marginata* may be found around the roots of plants in August and September with the var. *rimata*. They seem to prefer the immediate vicinity of the river, the latter variety being sometimes seen among the rubbish between the banks of the river's bed. My specimens are mostly from Winslow. *A. elata* is found with it.

The species of *Coniontis* seem to be more distinctively Northern and Western, as I took none in New Mexico nor Arizona. Farther North *C. obesa* may be found as far East as Green River, Wyoming, and Helena, Mon., under rubbish of various sorts. *C. opaca* occurred at Barstow, Cal., and Victoria, Vanc. I., *C. affinis* in eastern Oregon, and *C. ovalis* at San Diego. Of these *opaca* and *ovalis* were often found near the sea-shore, though not confined to it. Other species were taken at Spokane Falls and North Yakima, but are not yet named.

Cœlus ciliatus may be found close to the sea, under rubbish along the beach. I got only dead specimens at San Diego, in August, and do not know when it may be found alive.

Eusattus reticulatus, *Eu. difficilis* and *Eu. muricatus* may all be found around the roots of bushes in sandy places during July and August in New Mexico and Arizona.

Eleodes, with its numerous species, is a genus very characteristic of the West. They are known as "circus-bugs" among the Americans of New Mexico, on account, probably, of the antics they cut if startled when running. Try to pick one up and it elevates the abdomen as much as possible, nearly standing on its head to do so. Then, if you insist on touching it, you have to take the consequences. Some of the species eject an offensive fluid from the anus in a fine stream, but in others it seems to simply exude in a drop which adheres to the tip of the abdomen until wiped off. They are so quick that it is almost impossible to pick one up when it is aroused without the insect managing to bring the tip of the abdomen against the fingers. The fluid is much more offensive and caustic in some species than others, and often causes a burning sensation when it touches the skin: I think that *E. longicollis* has the most pungent secretion of any known to me. *E. dispersa* Lec. is one of the commoner species at Coolidge, N. Mex., in June, and may often be seen at the entrances of the burrows of the prairie dogs. When pairing it may be seen in numbers in patches of sand where the bushes are less numerous, running about in the day-time or copulating in slightly sheltered spots. A hundred miles farther west it gives place to the variety *sulcipennis*, which I have never seen in companies at pairing time. *E. suturalis* I never took west of Albuqurque, where it is rather rare. *E. tricostata* is common and lives chiefly at the roots of plants in company with *obsoleta* and *extricata;* with them is sometimes found *E. humeralis*. In California we find *E. quadricollis* under logs and on the border of the Colorado desert. I got a few *E. armata*, a fine species. *E. longicollis* is widely distributed through New Mexico, Arizona, Colorado, Wyoming and the adjacent regions. It varies in sometimes having the elytra rougher than the typical forms, which are nearly smooth. *E. gracilis* is rather rare, and may be found running around in the evening on the eastern slope of the Sierra Madre Mountains and on the Puerco divide from June to August. *E. nigrina* is rather common in the mountains around Flagstaff, Ariz., and *E. hispilabris* is found over an immense extent of territory. *E. caudifera* is abundant in the valley of the Little Colorado, close to the river; *E. pilosa* rare in the Sierra Madre, and *E. hirsuta* in the southern end of Idaho. I got a few speciments of *E. planipennis* in the Sierra Madre in June, and two or three in the mountains near Williams, Ariz., but never found it in the valleys. *Eleodes cordata* is a common Northern species, and *E. pimelioides* extends as far East as Green River, Wyo. *E. opaca* has the same range (as far as my experience goes) as *E. planipennis*, and seems to be a montane species. *E. fusiformis*, a curiously-shaped species, occurred only at Coolidge and Albuquerque, and is rare.

The next genus, *Embaphion*, is remarkable for having the sides of the thorax and elytra more or less explanate and reflexed, as in *Scaphinotus*, among the Carabidæ. Of the species I have seen this character is most strongly marked in *E. muricatum*, which occurs in Nebraska, Dakota, Montana and Colorado, from May to August. It seems to be rare, at least I got only about half a dozen specimens on my last trip. *E. depressum* and *elongatum* are found at various points in New Mexico and Arizona from April to September. They are provided with a secretion something like that of *Eleodes*, but which leaves a reddish stain on the hand when soap and water is applied, instead of a yellow or brown stain as in the latter genus. *Trogloderus costatus* is a remarkable insect which I have taken in the vicinity of cottonwoods at Winslow, Ariz., and Green River, Wyoming.

Eulabis pubescens may be found along the sea-shore at San Diego under logs and boards in company with *Amphidora nigropilosa*, and an occasional *Cratidus osculans*. The last species also occurs at Los Angeles, so it is not confined to the immediate neighborhood of the coast.

One specimen of *Argoporis costipennis* was taken near Peach Springs, Ariz., under an old cowhide in August. I never met with another example.

Iphthimus serratus is a well-known Northern species, and infests the pine, living beneath the bark of dead trees. In Arizona it is represented by the variety *sublævis*, which has the same habits. My specimens are from the vicinity of Williams at an altitude of about 7000 feet. It does not occur in the plains where the pine trees are lacking. *Cœlocnemis punctata* (a nearly smooth variety) is found with it, while at Winslow and east into New Mexico a rougher form extends. *Upis ceramboides* I took under the bark of cottonwood at Glendin, Mont., with a few specimens of *Nyctobates pennsylvanica*. At the Needles I took a new *Alæphus* under a board. *Mecysmus angustatus* flew to my light at Winslow, Ariz. The species of *Blapstinus* have habits so similar to one another that the description of one will do for all. They are found under pieces of wood or dry dung, among dead leaves or beneath rubbish of any sort, and some species may be found at any points in the West. *Conibius* and *Notibius* have much the same habits, but are rarer. *Ulus crassus* I took under rubbish near Los Angeles.

Cnemeplatia sericea is a curious insect, reminding one somewhat of *Heterocerus*. I took one specimen at Holbrook, Ariz., and one at Albuquerque, N. Mex., the latter was flying in the evening, the former I think I took from beneath a piece of board, but can find no note relating to it. A still more curious little animal is *Alandes singularis*, of which I got a few specimens from an ant's nest at Huntington, Oreg., about the end of May. The nest was under a stone in a grassy spot, and with the ants were about a dozen of these *Alandes*. They are curious little things, very strongly punctured, with setose elytra, and an immoderately deep quadrate basal thoracic impression, matching a similar one at the base of the elytra.

While tearing up an old pine log at Victoria in company with a friend, we found a large colony of *Pthora americana* Horn, a little insect resembling our *Diædus punctatus* in appearance. The wood was completely rotten, so that it could be easily be broken up with the aid of a heavy knife, and the beetles were found all through it instead of just under the bark. *Cynæus depressus* is found in pine at Williams, Ariz., just beneath the bark.

Under the sea-weed along Colorado beach were plenty of *Phaleria rotundata* sharing their ill-smelling feast with *Cercyon*, *Saprinus* and numerous Staphylinidæ. *Platydema janus* Fab. is found under the bark of cottonwood at East Bridge, Ariz., and *P. oregonense* under pine bark from Cœur d'Alene, Idaho, to Coolidge, N. Mex., with *Hypophlœus substriatus*.

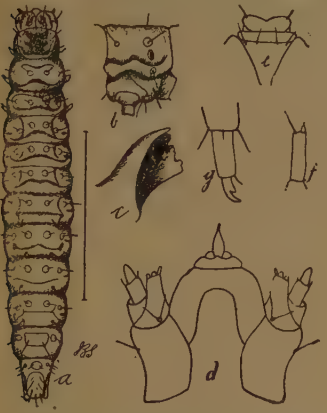
Helops is found under sticks and rubbish, especially along the river bottoms early in the spring. *H. attenuatus* occurred in the Sierra Madre Mountains. *H. arizonensis* and two undetermined species along the little Colorado, and *H. pernitens* at Portland, Oreg. Other species occur in Western Wyoming.

A NEW SPECIES OF BOTIS.

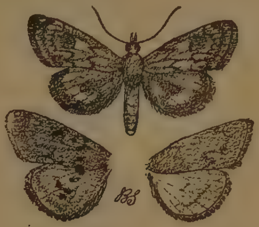
BY JOHN B. SMITH.

During the summer of 1889 I received from Mr. J. T. Brakeley, of Bordentown, N. J., some buds, flowers, seed capsules, as well as leaf and flower stems of the Egyptian Lotus all badly damaged by a lepidopterous larva. Mr. Brakeley informed me that in the earlier stages the larvæ fed exposed upon the leaves, but soon bored into the stems, buds or seed capsules, evincing a special fondness for the latter. The specimens received by me were nearly full grown, pupated in a very few days and the resulting moths were declared by "authority" as a new species generally confused with *Botis penitalis*. I published a short account of the species in "Garden and Forest" Feb. 19, 1890, under the name *Botis nelumbialis*, of which I now offer a description:

Botis nelumbialis n. sp.—Ground color varying from a pale, clear luteous to a ferruginous reddish luteous, powdery, all the intervening shades being recognizable. Head, palpi and thorax concolorous. Primaries with t. a. line single, upright, with three subequal outward angulations. T. p. line single, dusky, widely bent over the cell and there dentate or serrate, then with a long incurve on vein 2, and an outward angulation on the submedian interspace. Beyond the t. p. line is a broad dusky shade outwardly tolerably even, inwardly irregular. Fringes dusky. An indefinite dusky blotch in the cell beyond the t. a. line indicates the orbicular, and a much larger vague blotch beyond the end of the cell indicates the reniform. These markings may be all completely and clearly present, or all save the transverse lines may be obsolete, or on the other hand the markings may be obscure and vague, yet all traceable. Secondaries paler, thinner, somewhat glistening. A variably distinct outer band, dusky in color, and an extra discal, dentate, transverse line not attaining either margin. A variably distinct discal spot. Beneath the color is more whitish, primaries with an outer line more or less indefinite, a vague dusky blotch beyond the cell, and apical region dusky. Secondaries with the maculation of upper side more faintly reproduced. Expands .87—1.12 inches; 22—28 mm.



a, larva from above; *b*, single segment from side; *c*, mandible; *d*, maxilla and palpi; *e*, clypeus; *f*, antennæ; *g*, leg, enlarged.



Botis nelumbialis and varieties.

This species has a little the appearance of *B. penitalis* Grt., and has been confused with that species. The variable characters are in the ground color, in the size, and in the distinctness of maculation. A small, fully marked specimen might easily be taken as distinct from the larger forms in which the markings are either not defined, or obscured by powdery atoms.

Description of Mature Larva.

Length 21 mm. = .84 inch. General color dirty white, often with a reddish brown tinge on dorsum, sometimes forming two broad brownish bands. Head luteous, smooth shining, sparsely set with hair, maculate with small red-brown dots which sometimes cover nearly the entire head, but more usually make a triangular blotch on the vertex and a lateral oblique band. The cervical shield is like the head, and is similarly maculate with brown. Sometimes the markings are faint and scarcely noticeable, and sometimes they form a distinct central mark with margins of shield also brown. The following segments to the 12th have each four obvious smooth piliferous spots, scarcely tubercles, each bearing a single hair. They are all on the anterior part of the segment, one on each side of the middle, the other just above the stigmata. On segments 8 to 11 are two small, smooth dots, bearing each a single hair on the posterior part of the segment. Segment 12 has a smooth square in the centre bearing two hairs, and a round, smooth spot each side. Segment 13 is like 12, save that the spots are much reduced, and there is an oval anal shield, the posterior edge of which is roughened. The legs are whitish, prolegs with a complete circle of hooks. In general form the larva is slightly depressed, and at first sight resembles a noctuid more nearly than a pyralid.

The larva spins a rather flattened cocoon of a quite dense texture inside the stem and changes to a blackish brown pupa about .56 inches = 14 mm. in length. The pupa is quite slender compared with the larva, the wing cases long, the abdominal segments transversely wrinkled.

The duration of the pupa stage is short, not exceeding ten days and probably less.

On the occasion of a collecting trip to the sea-shore by Mr. Schwarz, Mr. Wenzel and ye editor, Mr. Wenzel suggested that it might be a good idea in order to promote good feeling and social intercourse among the collectors of New York, Philadelphia and intermediate points, to arrange for a field meeting at some central point. The suggestion was well received, and at a recent meeting of the Feltman Collecting Social of Philadelphia, ye editor was requested to present the matter to the Brooklyn Entomological Society and to the Newark Entomological Society. The latter society at their last meeting in February acted upon the suggestion, appointing Mr. Machesney and ye editor a committee to confer with committees from the other societies, and to arrange the necessary details. The Brooklyn Entomological Society, likewise took favorable action at their March meeting, appointing Mr. Roberts and ye editor as the committee. The Feltman Club appointed as its representatives Messrs. Wenzel and Dr. Castle. In an informal way the committee has considered dates and localities, the former being rather definitely set as July 4th, while the locality is still somewhat indefinite. It is the desire of the committee to get together at this field meeting as many of the entomologists and collectors as possible, in order that they may become personally acquainted, and all, whether members of the Societies named or not, are heartily invited to join. Full particulars will be published in the June number of Ent. Amer. and "Ent. News."

NEW CALIFORNIA HOMOPTERA.

BY E. P. VAN DUZEE.

(Continued from p. 80, vol. vi.)

9. Thamnotettix atropunctata n. sp.

Form of the preceding, but smaller. Color bright fulvous brown; head black tinged with rufous, especially on the front. Head, pronotum and scutellum with twelve black dots, arranged, two on the vertex, a row of eight on the anterior margin of the pronotum and on the disc of the scutellum two. Basal angles of the scutellum with a black spot. Length 3.5 mm., female.

Head a little wider than the pronotum, obtusely angled before. Vertex about one-half longer at the middle than next the eye, with an impressed central line, obsolete before the apex. Front slightly widened above the antennæ, the sides feebly convex toward the tip. Clypeus broad, a very little widened apically, the sides straight; apex rounded in conformity to the curve of the cheeks. Loræ large. Cheeks wide, the sides feebly arcuated, beneath the eyes not at all angled. Entire head and the scutellum punctured, the apical field of the latter more coarsely so. Sides of the pronotum rounded, disc obsoletely rugulose and uneven.

Color: Vertex pale yellow, suffused with rufous, especially toward the apex, where there is a brown cloud, interrupted on the medial line; near the posterior margin are two oval black spots, placed midway between the impressed central line and the eyes, and a small brown point adjacent to each ocellus. Face pale rufous, apex and an ill-defined longitudinal line on the middle of the front paler; sutures and a row of short transverse lines on each side of the frontbrown; be low the eyes an indistinct brownish cloud occupies the disc of the cheeks. Pronotum fulvous brown tinged with purple before; anterior submargin with a row of eight distinct black points, the two on either side of the central pair slightly advanced beyond the line of the others. An oval spot within each basal angle of the scutellum, two dots on the disc, and the transverse line black; anterior field pale, posterior obscure rufous. Elytra bright fulvous brown with strong coppery reflections produced by the highly iridescent wings beneath; nervures distinct, pale, marked with whitish where they intercept the pale sutural nervure; costal nervure pale nearly to the apex. Wings smoky, nervures brown. Legs and beneath testaceous brown; abdomen suffused with rufous; darker on the disc; pygofers and edge of the last ventral segment pale, the former shaded with rufous brown toward the apex; ovipositor rufous; spines of the posterior tibiæ pale.

Ultimate ventral segment nearly twice the length of the preceding; lateral angles somewhat obtusely produced; each side of the center is a narrow incision reaching to the middle of the disc, leaving a square central tooth, which is minutely emarginate at its apex. Pygofers broad, with a few stout spines near the suture, arranged in a double row.

Described from a single female (No. 630). This may prove but a variety of the preceding, but the dissimilar coloring and the form of the last ventral segment would seem to entitle it to specific distinction.

10. Thamnotettix limbata n. sp.

Above dark brown; costal margin of the elytra and all beneath yellow. Vertex produced, subacute. Length 5 mm., male.

Head a very little wider than the pronotum. Vertex flat, its length equal to its breadth on the hind margin, and scarcely less than the length of the pronotum; before produced to a subacute point; passage to the front rounded. Front slightly reflexed above, almost encroaching on the disc of the vertex before; ocelli placed at about one-third the distance from the eye to the tip of the vertex and well up on the anterior rounded edge of the head, distinctly visible on the margin of the vertex when viewed from above. Sides of the front almost straight. Clypeus broad, rounded at the extremity, a little constricted near the base. Loræ long, of moderate width. Cheeks narrow, sides nearly straight, a little waved below the eyes, exterior to the loræ very narrow. Elytra long and narrow; costa feebly convex, costal area with several supernumerary transverse nervures near the apex.

Color: Head pale yellow; front embrowned, a few transverse arcs above and the central line, pale; vertex washed with brown, before the posterior margin with two short oblique lines placed near the eyes and an abbreviated central impressed line, darker brown, eyes black. Pronotum clear pale brown, darker on the anterior margin, where there are some irregular pale lines forming an annulus behind each eye and leaving two brown points on a pale area at the apex. Scutellum brown, darker than the pronotum. Elytra blackish brown; broad costal margin bright sulphur-yellow, before the apical areoles with three or four small hyaline cells formed by a few extra transverse nervures; discal nervures pale brown, paler toward the apex on the yellow costal area concolorous. Wings smoky iridescent, with brown nervures. Beneath clear yellow; dot at the base of the tibial spines and apex of the tarsal joint blackish. Abdomen black, narrow margin of the tergum and the venter yellow; plates with an abbreviated blackish central line at base, the tips infuscated.

Genital pieces: Valve very short and broad, apical margin a very little convex; plates long, gradually narrowed to the apex; margin heavily fringed with long white hairs, especially toward the base; submargin with a row of about ten stout spines; apex of the pygofers with a dense cluster of similar, but larger spines.

Described from a single male example (No. 612). In general form this insect has much the appearance of a small *Tettigonia*, while in the position of the ocelli it approaches *Acocephalus*. It appears to sustain about the same relationship to *Thamnotettix* as does the genus *Anoterostemma* L. to *Athysanus*, but the former genera are perhaps less widely differentiated than the latter.

11. Allygus inscriptus n. sp.

Broad oval, or almost oblong. Pale testaceous, more or less tinged with yellowish on the vertex, irrorate with darker on the thorax; elytra clouded with fulvous; marked with whitish on some of the basal areoles and transversely banded with the same color near the middle, the fulvous areas sparingly inscribed. Length 4—5 mm.

Head scarcely narrower than the pronotum. Vertex bluntly triangular, about two-thirds the length of the pronotum, the apex obtusely rounded;

surface with a slight transverse depression before the tip. This depression and an impressed line from it to the hind margin are marked with pale brown, and six dots are faintly indicated, two just behind the apex, two smaller ones on either side of these and two faint ones behind the hind margin near the eyes, some or all of which may be obsolete. Face broad, obtuse; cheeks very obtusely angled below the eyes; front truncate ovate, at least twice as broad at the ocelli as at the clypeus; the latter widened toward the tip, which is obtusely triangular, and extends a little beyond the loræ; loræ broad, together almost circular in form; cheeks barely surpassing the loræ. Face whitish testaceous, tinged with yellowish on the front; sutures of the loræ embrowned.

Pronotum broadly rounded before, truncate behind; sides very short, the latero-posterior margin reaching almost to the eye; lateral angles rounded. Surface obscurely irrorate or mottled, darker on the disc; beneath whitish. Scutellum about as long as the pronotum; the basal angles and a transverse impressed line dusky or brown; the narrow edge more or less distinctly alternated with brown and white. Elytra whitish hyaline, paler toward the apex; broadly clouded with fulvous from near the base to the middle, and from beyond the middle nearly to the apex, leaving a central transverse whitish band; tip of the clavus dark brown; nervures brown, on the costa and apex margined with the same color; apex with a submarginal dusky band; discal areoles on the clavus and corium sparingly inscribed with brown within the fulvous areas. Wings pale smoky hyaline, iridescent. Legs white with black points at the base of the tibial spines. Venter pale, somewhat blackish toward the base and on the connexivum; terminal segment about the width of the preceding, truncate, the two edges parallel. Valve very short-triangular, about the length of the last ventral segment. Plates together a little longer than broad; their sides fringed with long pale bristles.

Described from two males (No. 222). A third male (No. 259) differs from the others in being larger, with a shorter, obtusely rounded vertex, the markings on which are darker; on the front a double series of transverse lines and the sutures are brown; the elytra are paler with the fulvous areas much reduced, leaving the transverse band but feebly contrasted. It is not impossible that individuals may yet be taken connecting this species with *Athysanus irrorellus* Stal, but the present material cannot be referred to Stal's species without doing violence to any reasonable interpretation of his description or of the specific characters known to obtain here.

This is a true *Allygus*, agreeing with *A. mixtus* Germ. in all important characters, and is the only North American species of this genus known to me. *Jassus irroratus* Say and its numerous allies have but one connecting nervure between the branches of the first and second sector on the elytra, and belong to *Phlepsius* Fieber. This apparently trivial, and not infrequently variable character, seems almost inadequate for use in separating groups of genera, but correlated as it is with other structural peculiarities of which it is the most pronounced, it appears to answer well the purpose of its employment, and is much used by Fieber and other European entomologists in synoptical arrangements of the genera.

12. Platymetopus elegans n. sp.

Form of *P. acutus*. Cinereous; beneath and a broad dorsal stripe from the middle of the vertex to the tip of the clavus pale yellow. Length 5 mm., female.

Head narrower than the pronotum; length of the vertex about one-half greater than its width between the eyes; sides of the narrow front broadly waved, contracted at the antennæ, a little widened below and again narrowed to the apex. Clypeus long, narrowed at base, widened at the rounded apex, which distinctly surpasses the cheeks. Loræ long, at their greatest breadth a little wider than the apex of the front. Cheeks broad, triangular, almost covering the propleuræ. Pronotum a little longer than in *acutus*, three-fifths the length of the vertex; the angles prominent, obtuse. Elytra a little narrowed toward the apex, not so wide as in *P. acutus*, the costal area with about eight strong transverse nervures. Rostrum reaching the base of the intermediate trochanters.

Color: Vertex cinereous before, yellow on the posterior disc; cinereous portion crossed by three longitudinal yellowish white vittæ, distinguished from the disc by slender brown lines; the central vitta begins at the tip of the vertex, where it is distinct, and loses itself posteriorly in the yellow disc between the lateral vittæ; these lay adjoining the central vitta and become obsolete before attaining the apex; close to each eye is an elongated whitish spot, more or less obvious; margin of the head with a double slender fuscous line leaving the extreme edge pale. Face yellow, pale below, with a broad cinereous band on the base of the front, on the lower or apical edge of which is a V-shaped white line edged with blackish. Ocelli fulvous. Eyes rufous, bordered behind with pale. Antennæ white, setæ brown; pronotum yellow, slightly discolored on the disc by the black mesonotum beneath; sides with two broad cinereous bands behind each eye, edged with a blackish line and separated from each other and from the blackish lateral margin by narrow stripes of the yellow ground color. Exposed surface of the propleura, the meso- and meta-pleura outwardly, and the entire scutellum sulphur-yellow; sternum and legs soiled white; tip of the tibiæ and the tarsal joints embrowned, the tibial spines inserted in black points; claws black. Elytra pale brownish cinereous, subhyaline; broad costal margin and two or three obscure, irregular, transverse bands on the corium whitish hyaline; clavus, excepting an obscure cinereous cloud along the outer basal margin pale yellow; surface of the clavus and disc of the corium irregularly sprinkled with obscure pale rufous dots and blotches; cinereous areas sparingly and very minutely inscribed with fuscous; transverse costal and apical nervures and some spots on the discal nervures dark brown, heavy; apical submargin with a brown band. Venter pale testaceous, inclined to cinereous in spots, and marked more or less broadly with black on the base of the connexivum; apex of the pygofers and an area on the posterior margin of the ultimate ventral segment also black.

Last ventral segment moderately long, with an obscure central carina; posterior margin broadly rounded, with a minute central notch.

Described from a single female example (No. 610). This species shows no indications of the oval white or hyaline elytral spots found in our other American species of *Platymetopius*, and seems to be a very distinct form.

13. Deltocephalus coquilletti n. sp.

Form nearly of *D. debilis* Uhl., but somewhat broader, with a shorter vertex. Black, head and pronotum with four transverse white or fulvous bands; elytra with as many oblique or transverse white lines. Length: male, 4 mm.; female, 5 mm.

Head a little wider than the pronotum. Vertex flat, sharply, but bluntly angled before; length at the center equal to three-fifths of the width on the hind margin, and three-quarters the length of the pronotum; passage to the front subacute. Face broad, front narrow, occupying hardly more than one-half the space between the eyes, moderately narrowed toward the apex; sides constricted opposite the antennæ. Ocelli situated a little less than one-half way from the eye to the apex of the head. Clypeus narrow, sides straight, or nearly so, apex rounded. Loræ long, about as wide as the clypeus. Cheeks broad, well angled below the eyes, very narrow beyond the loræ. Pronotum short and broad, almost oblong; anterior margin feebly rounded, posterior straight; sides long, viewed from above almost straight, the angle to the posterior margin well rounded; the latero-posterior margins not distinct from the sides. Scutellum broad, almost as long as the pronotum, closely punctured. Elytra broad, apex truncated; longitudinal nervures distinct, transverse obscured by the white lines. First apical areole of the wing broad on the base. Face, legs and entire lower surface finely and closely punctured.

Color dark brown or black; vertex, pronotum and clavus polished black; scutellum dull. Anterior and posterior margins of the vertex and a transverse band on the disc of the pronotum, obsolete before reaching the sides, fulvous; lateral and posterior margins of the pronotum broadly white; medial line of the scutellum, two dots anteriorly on the disc, and two marginal ones before the apex, fulvous; ocelli bright fulvous; face deep black with a broad transverse fulvous band on the middle, curved to correspond very nearly with the superior edge. Legs, tergum and all beneath deep black; anterior and intermediate tibiæ and tarsi, apex of the posterior coxæ and the genitalia, brown; outer edges of all the tibiæ and their spines soiled white, the abdominal segments narrowly margined with the same color. Antennæ black; setæ brown, pale at base. Elytra dark brown; clavus, basal areole of the corium and margin of all the nervures as far as the apical areoles, black; nervures, except at the apex, white; a broad band on the apex of the basal areole extended posteriorly along the inner sector, another on the base of the antiapical areoles, the claval nervures broadly and the apical margin narrowly, ivory-white. Wings deep smoky, hyaline; iridescent: uervures, slender, fuscous.

Genital pieces.—Male: valve broad, triangular, apex rounded; plates broad, convex, together semicircular in form, fringed with soft white hairs, the submargin with a row of stout bristles; on the disc, near the apex, there is, in some examples, a small pale spot.

Female.—Last ventral segment one and a half times as long as the preceding, narrow and compressed on the sides so as to inclose the base of the pygofers, the apex feebly concave across its whole width; pygofers long and rather narrow, the inner margin and apex narrowly pale and sparsely covered with short bristles.

Described from three males and two females (No. 611). The number of brown marks beneath and the extent of the white bands above is subject to some variation. It is with pleasure that I dedicate this large and striking species to the well-known scientist who has been instrumental in bringing to our knowledge this and many other rare and interesting insects.

14. Deltocephalus minutus n. sp.

Above pale greenish yellow; vertex with two oblique fulvous spots on the disc; tergum and all beneath deep black. Length 2.25 mm.

Head a little wider than the pronotum; anterior edge well rounded. Vertex almost as long as the pronotum; anterior angle obtuse, surface a little sloping. Front short and broad, transversely convex, its length and breadth subequal. Clypeus about two-thirds the length of the front, regularly narrowed to the apex, margin almost rectilinear. Loræ small, extending about two-thirds the length of the clypeus. Cheeks wide, strongly angled just below the eyes; margin beyond the loræ broad, reaching the apex of the clypeus. Anterior margin of the pronotum strongly rounded, hind margin feebly, angularly, concave; sides very short; latero-posterior margins straight and oblique, the angles obtuse. Scutellum small. Elytra longer than the abdomen, narrow, the costal margin but feebly convex; apical areoles large.

Color: Vertex including the fore margin to before the ocelli, yellow; posterior disc with two approximate oblique fulvous spots which diverge anteriorly; apex sometimes with two minute black points. Eyes and ocelli black. Face deep black; outer angles of the cheeks below the eyes, two small points on the base of the clypeus, another at the outer edge of the loræ, and in some examples faint indications of the transverse lines on the front, yellow. Base of the rostrum pale. Antennæ brown, apex of the first joint pale. Pronotum pale yellow, sometimes tinged with green; anterior margin slightly uneven. Elytra whitish hyaline, tinged more or less strongly with greenish yellow toward the base. Nervures pale yellow. Wings hyaline, feebly iridescent; nervures pale brown, inconspicuous. Legs testaceous brown; femora and some dots on the posterior tibiæ black. Abdomen black; edge of the connexivum and posterior margin of the last dorsal segment yellow; inner edge and apex of the plates testaceous.

Genital pieces.—Male: Last ventral segment rather deeply concave. Valve broad and short, apical margin obtusely triangular. Plates triangular, their apex produced, the submargin with a few short bristles. Styles extended beyond the tip of the plates, toward their apex fringed with numerous stout bristles. Pygofers short, below thickly covered with short white hairs, above and toward the apex with stout dusky bristles.

Described from three males (No. 610); females unknown to me. This minute species bears a marked resemblance to *D. melsheimerii* Fitch, than which it is almost one-half smaller. It still more closely resembles specimens of *D. minkii* Fieber, collected in Quebec, and kindly furnished me by M. L'Abbe Provancher. The fulvous markings on the vertex are variable in extent as is the number of pale spots on the face.

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 69, vol. vi.)

PACHYTA Serville.

Prothorax acutely armed at the sides; eyes moderate, feebly emarginate; tibial spurs terminal as usual. The species may be separated as follows:

Elytra slightly tapered, maculate, nearly rounded at tip . . . **monticola.**
Elytra strongly narrowed behind, testaceous, maculate or black, feebly truncate and dehiscent . . . . **liturata.**
Elytra strongly narrowed behind, truncate and subbidentate at tip, posterior half of side margin black, reaching suture at tip . . . . **armata.**
Elytra subparallel, subæneous with narrow transverse band wavy, tip rounded . . . . **rugipennis.**
Elytra subparallel, testaceous, truncate at tip . . . . **spurca.**

P. monticola Rand. Bost. Jour. II, p.27. Lec. Agass. L. Sup. p. 235, t 8, f. 12, a. b.
Length 9 mm. = .36 in. *Habitat.*—Maine, Mass., N. Y., Can., L. S., Anticosti.

Black, elytra finely and densely pubescent, testaceous with tip and four black spots, nearly confluent along a line near the suture.

P. liturata Kirby, Fn Bor. Am., IV, 1837. p. 178; Mann. Bull, Mosc. 1852, II, p. 367; *nitens*, Lec. l. c. p. 235; J. A. P. ser. 2, I, p. 319.
Length 15—18 mm. = .60—.72 in. *Hab.*—L. Sup., Col., Vt., Mich., Id., N. Mex., Wy., W. T., Alaska, Vanc.

Black, elytra coarsely and confluently punctured, glabrous, humeri prominent, testaceous, vaguely or decidedly quadrimaculate with black or entirely black. Antennæ short and very stout ♀, or about half the length of body and more slender ♂.

P. armata Lec., S. M. C., No. 264, 1873, p. 207.
Length 16—19 mm. = .64—.76 in. *Hab.*—W. T., Or., Id.

Black, elytra punctured as in preceding, humeri prominent and disc very convex behind the base, testaceous with black space extending from suture at tip obliquely to the middle of the margin. Antennæ, ♀, half as long; ♂, nearly as long as body.

P. rugipennis Lec. l. c. (Newn. ms.).
Length 13—16 mm. = .51—.64 in. *Hab.*—Can.

Black, subæneous, antennæ, femora and base of tibiæ ferruginous. The sculpture of the elytra consists of a reticulation of smooth, strongly elevated lines with the depressed spaces coarsely punctured; from the punctures proceed rather coarse golden hairs. Antennæ: ♂, two-thirds as long as body; ♀, shorter.

P. spurca Lec. Ent. Rept., 1857, p. 63; *cervinus* Walker, Nat. Vanc., 1866, II, p. 332.
Length 23 mm. = .92 in. *Hab.*—Cal., Vanc., Nev.

Testaceous, elytra rather coarsely punctured and with faint traces of costæ, fairly pubescent, each with a small dusky spot at the middle near the margin. Antennæ: ♂, as long as body; ♀, shorter.

ANTHOPHILAX LeConte.

Synoptic Table by Dr. George H. Horn.

Antennæ slender, third joint much longer than fourth.
  Elytra coarsely punctate scabrous, more or less metallic.
    Elytra greenish blue; legs black . . . . **viridis** ♀.
    Elytra cupreo-æneous to blue; legs pale . . . . **malachiticus** ♂.
  Elytra testaceous, irregularly maculate with piceous spots.
    Surface coarsely sparsely punctate, and with small spaces which are distinctly pubesecent; median line of thorax distinctly impressed. **attenuatus**.
Antennæ stouter, third and fourth joints short, stout and nearly equal in length.
  Elytra impunctate, dull velvety red, scutellar region and apex black. **mirificus** ♂.
  Elytra coarsely punctate, scabrous at basal half, abruptly smoother at apical half; wholly black . . . . **mirificus** ♀.
  Elytra coarsely not closely punctate at basal half, abruptly smoother at apical half; wholly black . . . . **tenebrosus** ♀.

Thorax convex in *tenebrosus*, broadly longitudinally sulcate in *mirificus* ♀ and ♂. I suspect that *viridis* and *malachiticus* are sexes of one species.—GEO. H. HORN.

A. viridis Lec. Agass. L. Sup. p. 236, J. A. P. ser. 2, 1, p. 326.
Length ———. *Hab.*—Lake Sup., Mich.

A. malachiticus Hald., Trans. Am. Phil. x, 1847, p. 64; Lec. J. A. P. ser. 2, 1, p. 326; *cyaneus.* Hald., Proc. Ac. Phil. iii, p. 151.
Length 13 mm, = .52 in. *Hab.*—Somerset Co., Pa.; Lake Sup., Mich., Can., Mass.

A. attenuatus Hald., Trans. Am. Phil. x, 1847, p. 59; Lec. Agass. L. Sup., p. 235; J. A. P. 2, 1, p. 319.
Length 14 mm. = .56 in. *Hab.*—Eagle Harbor, Lake Sup., N. B., S.W. Virginia.

A. mirificus Bland, Proc. Ent. Soc., 1865, p. 382; *venustus* Bland, l. c. ♀.
Length 14—19 mm. = .56—.75 in. *Hab.*—Col., Id.

A. tenebrosus Lec. S. M. C., No. 264, 1873, p. 208.
Length 12 mm. = 48 in. *Hab.*—S. E. Cal.

The species of *Anthophilax* seem to be very rare in collections, and I regret that the genus is very poorly represented in my own.

On the Habits of Phlœophagus and Stenoscelis.

BY FRANK H. CHITTENDEN.

Our two native species of *Phlœophagus* live in the dead wood of various deciduous trees, sometimes occurring together and frequently also in company with a closely related species, *Stenoscelis brevis* Boh. My observations would indicate that the three species are of nearly identical habits. The mature insects pass a considerable portion of their existence in the mines which they excavate in wood, seldom appearing abroad or on the wing, and it is owing to their habits that these somewhat common beetles are seldom taken by collectors in any numbers.

Small round holes resembling pin-holes made by the adult *Phlœophagi* in their egress from their living quarters may frequently be seen thickly scattered over the dead, bare portions of a variety of trees. The similar, larger holes of *Stenoscelis brvis* are usually to be found in the same situations. It may be worth while to mention that I have always observed these species in the dead portions of living trees, or in the upright trunks of dead trees and only in parts that had been denuded of bark. I have never taken them from logs or the smaller branches of trees, and have never known an instance of their boring through or living under bark.

The larvæ occur with the imagines, and though the two genera occur together, it is not difficult to separate them. The pupal stage is doubtless, of brief duration, as I have never succeeded in securing a single specimen.

Phlœophagus apionides Horn was observed on a dead birch tree in July, and both larvæ and beetles occurred in April in a stump of wild black cherry (Prunus serotina).

P. minor Horn I have found in greater abundance than the above. It was taken from birch, willow and elm wood in July and November. Both species have been cut from ash by Mr. William Jülich (Ent. Amer. vol. iv, p. 35).

P. spadix Hbst., an imported species, was found on the seabeach by Mr. Jülich (l. c.) in water-soaked pine drift wood.

Stenoscelis brevis Boh. is more common than any of the above. I have observed it on the following trees: basswood, beech, birch, butternut, elm, maple, sycamore, willow and European linden. Specimens were taken from the wood in October, November, December, January, May and July, and were found abroad in the last two months crawling about on the infested trees.

SOCIETY NEWS.

BROOKLYN ENTOMOLOGICAL SOCIETY.—Meeting March 4th. Present Prof. John B. Smith in the chair and seventy-five persons. Minutes of the last meeting, the Treasurer's report for February, and the report of the Librarian were read and approved. The appropriation of $150 for the support of the ENTOMOLOGICA AMERICANA for 1890, by the council of the Institute under certain conditions, was referred to the Executive Committee for report. Messrs. J. B. Smith and C. H. Roberts were appointed a committee to confer with committees from the Newark and Philadelphia Entomological Societies as to date of a joint field meeting of the members of the several societies during the coming season. Messrs. Rodrigues Ottolengui, of 486 Vanderbilt Avenue, Brooklyn, and Martin H. Wilckens, of 261 Henry Street, Brooklyn, members of the Institute, were elected to membership in the Society. The exchange of the ENTOMOLOGICA AMERICANA with the "Entomological News" was approved.

Mr. Zabriskie exhibited male and female of the *Diomorus Zabriskii* Cress., a hymenopterous parasite on the bee, *Ceratina dupla* Say, and the wasp *Crabro stirpicola* Pack., together with enlarged diagrams showing the structure of the external organs. This parasite is the only recorded species of its genus in this country, and had been only seen by him on two occasions when reared from nests of the above hosts in stems of cultivated Black Raspberry.

Mr. Hulst spoke at length upon "the Phycitidæ of North America," illustrating his remarks by charts and black-board sketches of structure. He first gave a history of the family from the time of Linnaeus to the present. He then explained what a Phycitid was, showing how the family was separated structurally from the rest of the Lepidoptera.

A description was then given of the eggs and of the larvæ and their habits, some of which infest berries, others flour, meal, canned and dried fruits ; some are twig borers, other live in silken cocoons among leaves. One has the remarkable habit of living upon bark lice, and was the first known instance of a North American caterpillar having that habit.

After this the imago was taken up, and the structure of all the organs was explained in detail. Mr. Hulst took the ground that the bitufted maxillary palpi which some of the males have, allied them very closely to the Epipaschiidæ. He also showed that the structure of the ♂ genitalia separated them into two distinct groups.

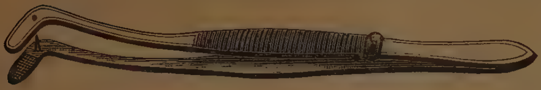
Mr. Hulst afterwards exhibited his collection of North American Phycitidæ, in which are found the original types of nearly half the known species, and typical specimens of a large proportion of the rest.

The meeting adjourned after an explanation of a number of stereopticon views by Prof. Smith.

A. C. WEEKS,

Recording Secretary.

JOHN AKHURST,
Taxidermist and Dealer in Entomological Supplies.



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Insects for identification, or as donations to the collection of the Society, go to either of the curators.

ENTOMOLOGICA AMERICANA

VOL. VI. BROOKLYN, JUNE, 1890. No. 6.

THE BLACK PEACH APHIS.

A new species of the genus *Aphis*.

By Erwin F. Smith, Sc. D., Washington, D. C.

Aphis persicæ-niger n. sp.

Winged viviparous female (*pseudogyna migrans*).—Antennæ as long as the body, sometimes a little longer or shorter, black or dark brown, borne on widely separate, inconspicuous tubercles, joints imbricated, vi and vii conspicuously so, the seventh always a little longer than the third; iii, 0.49—0.56 mm.; iv, 0.33—0.40 mm.; v, 0.20—0.29 mm.; vi, 0.09—0.11 mm.; vii, 0.47—0.61 mm.; sensoria rather large (0.01—0.02 mm.) ringed and distinct, numerous and very protuberant, giving to the under surface of the antennæ a strongly tuberculate, almost serrate character, about 40 on iii in three irregular rows, about 20 on iv in two rows, 5 or 6 on v in one row, and a group (4—6) on the rather broad distal end of vi, one of them longer than the others. Beak 0.69—0.96 mm., usually not much more than reaching to the second pair of coxæ. Thorax arched with a conspicuous button-like tubercle between the wings, black shining. Legs parti-colored; tarsi and tips of tibiæ (distal one-fourth or one-fifth) black or dark brown, coxæ and distal portion of femora (two-thirds, more or less) also dark, the rest pale or yellowish; femora smooth, or nearly so; tibiæ rather evenly and strongly spined beneath; tarsi 0.127 mm. Wings hyaline, slightly irridescent, no dusky patches or bands, stigma pale, rather broad (0.15 mm.). Abdomen somewhat constricted at junction with thorax, rounded behind and rather compact, seldom much longer than broad, slightly margined; dorsum smooth, black and shining throughout, or sometimes bordered with brown, never roughened, tuberculate, mealy, or punctate; venter uniform black or dark coffee-brown, no green or greenish markings. Cornicles twice the length of the tarsi and nearly three times the length of the style (0.25 mm. in most individuals), truncate and distinctly flanged, largest at the base (0.07 mm.) and tapering gradually to the apex (0.04 mm. under the flange), sometimes narrower at the base and slightly expanded in the middle, but never clavate, black or dark brown, smooth or indistinctly imbricate, opaque or translucent. Style not cone shaped, but very blunt rounded, nearly as long as broad (0.09 mm. × 0.11 mm.) and always a little shorter than the tarsi, provided with a few long pale bristles, and thickly set with short dark scales, which change toward the apex into short, spreading, papillose setæ. Anal plates not smooth, but imbricate like the style and bearing a fringe of long pale bristles. Body smooth, rather thick set and compact; length 1.96 mm. to 2.09 mm.; breadth wing to wing 6.54 mm. to 7.25 mm.; wing 2.73 mm. to 3.18 mm.

April to June. Leaves and twigs of the peach.

Apterous viviparous female (*pseudogyna fundatrix?* and *pseudogyna gemmans*).—Antennæ variable, usually about two-thirds the length of the body, black or dark brown, set on widely separate, inconspicuous, frontal tubercles; joints not tuberculate, vii almost always shorter than iii; no sensoria on iii or iv, one on distal end of v, and a group on the expanded distal end of vi. Beak reaching to second pair of coxæ and sometimes beyond, but not to third pair, except in immature specimens (0.53 mm. to 0.82 mm.). Thorax broad and flat, gradually widening posteriorly and blending with the very broad abdomen into a smooth and shining black plate, in which the separate segments are indistinguishable. Abdomen margined, broader than long, rounded behind, so that the insect is broad wedge form, sometimes almost cordate, especially when distended with pseudova. Abdominal segments distinct beneath, but usually only the last 2—3 visible above; venter, and sometimes border of dorsum, dark coffee-brown, the rest very black and shining, as if lacquered; sometimes a row of pits or depressions along the margins, corresponding to the stigmata, dorsum not otherwise pitted and free from hairs, tubercles, or mealiness. Length of body 1.64 mm. to 2.38 mm.; breadth 1.00 mm. to 1.50 mm.

In all other particulars like the winged form. The young are a uniform pale yellow or weak-coffee color, becoming darker with each moult. The insect bears no green or greenish markings at any stage of development.

January to December. All parts of the peach tree above ground and below. Commonest upon the branches from early spring to midsummer, but also observed in autumn and twice in midwinter (January, 1889, and January and February, 1890). Can be found upon the roots almost always at any time of year.

Habitat.—Virginia (!), Maryland (!), Delaware (!), New Jersey, Michigan (!).

Very abundant and destructive along the Atlantic coast, but rare in the West, as if recently introduced.

This aphis has been known to peach growers for more than twenty years, but does not appear to have been critically studied by any one. It has been identified with *Myzus persicæ* (Sulzer), which it does not resemble, and with *Myzus cerasi* (Fab.), which it resembles only superficially. Prof. Uhler thought it agreed most nearly with Koch's description of *A. chrysanthemi*, and in my first account of the insect* I followed his judgment, not having seen the winged form. Further study with abundant material has convinced me that it is distinct from *A. cardui* Linn., to which *A. chrysanthemi* Koch. has been reduced. So far as I have been able to observe during four seasons spent in the orchards, this aphis is confined exclusively to the peach. I have never found it on the roots or tops of orchard weeds, or even in neighboring cherry orchards. *Myzus cerasi* differs from it in half a dozen important particulars, *e. g*. Antennæ set on conspicuous frontal tubercles, gibbous on inner face, and only about one-half as far apart, joints not tuberculate, except iii, which is only slightly so; less than one-half as many sensoria on iii, five in one row only, none on iv, one on v; stigma narrower; no button-like tubercle on back of thorax; femora more inclined to be hairy; cornicles cylindrical and twice as long; style longer and distinctly cone-shaped. In the apterous form the dorsum is also minutely punctate throughout, like shagreen.

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* *Peach Yellows: A preliminary Report*, U. S. Dept. of Agric. 1889.

This insect is an *Aphis* rather than a *Myzus*, belonging most properly, I think, to that section of the genus classed by Prof. Oestlund as *Aphis nectarophorini.*

Among peach growers it is generally known as "the black aphis." It may, therefore, appropriately bear the name of *Aphis persicæ-niger*, especially since all the mature forms yet discovered are *shining* as well as black.

(To be continued.)

Mr. Liebeck, in "Entomological News" No. 4, gives an interesting account of how he makes use of a white dog to attract Coleoptera in early evening. A collector of no mean standing tells of a still more effective method which accident disclosed to him. It is his practice to take a stroll through the fields with his wife on summer evenings, and usually his beating net accompanies him. One evening, returning from a stroll, a light rain induced the lady, to protect the makeup of her hair, to turn up her skirt over her head, exposing the white petticoat. Soon our friend's attention was attracted by numerous black spots on this white surface, and investigation showed that they were Coleoptera, which were promptly bottled, and many of which proved good things. Of course it is not absolutely necessary that the white surface should be either a dog or a petticoat, but in default of anything better, either will answer as an attraction.

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 98, vol. vi.)

ACMÆOPS LeConte.

In the preparation of the following table and notes I have received much assistance from Dr. Geo. H. Horn; both in permission to examine his sets of the variable species (twenty species, of several of which no two are exactly alike), and by his experience as to the characters which are trustworthy in separating such. And I am indebted to Mr. Samuel Henshaw for numerous additions to the lists of localities. It is to be noted in this connection that many Western species which reach South to New Mexico, are there found among the mountains where the elevation causes climatic influences similar to their customary Northern habitat.

This genus contains a number of species of moderate size, in which the head is not at all, or only moderately constricted behind in *lisa*. Dr. LeConte indicated three groups. The last, containing only *pratensis*, is abundantly distinct by the very long mouth and front. The first has its characters most fully developed in *bivittata*, viz.: a short, stout form, tarsi short and stout, the first joint scarcely as long as the next two combined, short antennæ, the joints almost serrate, and the third and fourth joints neither as long as the fifth. The tarsal joints are densely clothed beneath with short pubescence, which on each joint is equally dense. The second group contains more slender species, the antennal joints longer and more slender, and the tarsal joints longer (especially the first) and unequally clothed beneath, most of the species having the dense pubescence confined to the third joint. *A. directa* represents the group, except that the first tarsal joint is abnormally long. This second group also contains those species which have a flattened thorax and most nearly resemble *Leptura*. The form of the prothorax varies considerably, being either decidedly angulated, or very indistinctly angulated, or rounded on the disc. In *discoidea* and *proteus* it is strongly flattened and channeled, with edges slightly prolonged and elevated each side. Many of the species are liable to great variations in color, which have been heretofore described as species, but are now considered unworthy to rank even as varieties, the various forms blending insensibly into one another. Following Dr. LeConte's paper, S. M. C. No. 264, 1873, I have prepared this

Synopsis.

Group I.—Short stout species; hind tarsal joints stout, equally pubescent beneath; antennæ stout, except in *thoracica*.

A.—Prothorax with lateral angle distinct, sides behind the middle concave.

Black, prothorax yellow, densely pubescent, elytra densely punctured. **thoracica.**

Color variable, very slightly pubescent, elytra sparsely punctured. **bivittata.**

Blackish blue, scarcely pubescent, elytra coarsely and distantly punctured. **atra.**

Greenish bronze, pubescent, elytra coarsely and sparsely punctured, general form less stout, and lateral angle of thorax more rounded. **subænea.**

B.—Prothorax with lateral angle rounded, not prominent, sides parallel behind.

Testaceous, feebly pubescent; punctures of elytra irregular towards base. **pinguis.**

Dark metallic blue, black or bronze; pubescence yellowish, soft and long. **tumida.**

Black, elytra violet blue; pubescence short, black, erect . . . . **viola.**

Group II.—Slender species; hind tarsal joints slender, last joint only usually densely pubescent beneath and more broadly bilobed; antennæ slender.

A.—Disc of prothorax convex, slightly channeled and densely punctured.

Prothorax longer than wide; first and third hind tarsal joints densely pubescent beneath, second wholly or partly bare.

Elytra more sparsely punctured, pubescence very short and sparse; elytra black, vittate more or less with testaceous, or wholly testaceous.

Sides of head parallel behind the eyes . . . . **longicornis.**

Sides of head oblique behind the eyes.

Prothorax more densely punctured . . . . **vincta.**

Prothorax shining, less densely punctured . . . . **ligata.**

Elytra more densely punctured with short pubescence; black, with the base more or less red . . . . **basalis.**

Prothorax wider than long; hind tarsi with third joint only densely pubescent beneath.

Hind angles of prothorax not prominent; pubescence sparse; elytra black, varying to testaceous, or with red humeral angle. **militaris.**

Hind angles of prothorax prominent; elytra black, varying to fuscous, clothed with soft, long pubescence . . . . **subpilosa.**

B.—Disc of prothorax convex, coarsely punctured, lateral angle prominent; antennæ stouter, third and fourth joints together not longer than fifth; elytra very deeply punctured.

Black; head, scape of antennæ, elytra and legs rufotestaceous. **lisa** n. sp.

C.—Disc of prothorax convex, not channeled, sparsely and finely punctured, elytra rounded at tip.

Sides of head behind the eyes straight, oblique, neck concave.

Testaceous; elytra coarsely punctured with suture, dorsal vitta and side margin black . . . . **directa.**

Sides of head behind the eyes tumid, rounded, smooth; prothorax more deeply constricted behind.

Black, with fine hoary pubescence, mouth and prothorax ferruginous. **falsa.**

D.—Disc of prothorax flattened behind and prolonged each side into a tubercle; elytra truncate at tip.

Prothoracic tubercles conical lateral; black, elytra opaque, base and side margin and sometimes the suture bright red . . . **discoidea.**

Prothoracic tubercles dorsal, obtusely rounded; black, elytra shining, more distinctly punctured, black, striped, testaceous or fuscous. **proteus.**

Group III.—A moderately stout small species; the front and mouth extremely long; antennæ inserted in front of the line joining the anterior margin of the eyes; prothorax campanulate, constricted in front, wider and feebly constricted behind; elytra truncate at tip.

Black, elytra black, fuscous, or testaceous, sometimes with a dorsal vitta and tip fuscous . . . . **pratensis.**

Bibliography, etc.

A. thoracica Hald., Trans. Am. Phil. 1847, x, p. 60; *sulcicollis* Dej., Cat. third edition, p. 381.

Length 8 mm. = .32 inch. *Hab.*—Pa., Mass., Va.

This species resembles the next in appearance, and seems to be rare in collections. I am unable to say to what extent it varies in color. Mr. Bland has described a form of this species under the name *incerta* with the base of the tibiæ yellow.

A. bivittata Say, J. A. P. 1823, III, p. 416; *nigripennis* Lec., J. A. P. ser. 2, I, 1850, p. 323; *varians* Lec., l. c., p. 324; *fusciceps* Lec., l. c., p. 324.

Length 6—9 mm. = .24—.36 inch. *Hab.*—N. Y., N. H., Ill., Ia., Wis., Dak., Neb., Mo., Kans., Col., N. C.

The typical form of this insect has the elytra yellow, with two black vittæ, while the thorax and legs may be either yellow, or more or less black. The form *nigripennis* has black elytra, with thorax more or less yellow. The form *varians* is entirely black, and *fusciceps* is entirely testaceous, except the dusky head. While there can be no doubt of the specific identity of all these forms, it may be well to retain some names for convenience in exchanging.

A. atra Lec., l. c. 1850, p. 323.

Length 8 mm. = .32 inch. *Hab.*—Oreg., Wash., Nev., Idaho.

The coarse, sparsely-placed punctuation of the elytra, and very sparse pubescence, make this a very distinctive species.

A. subænea Lec., l. c. 1850, p. 101.
Length 9 mm. = .36 inch. *Hab.*—Cal.

This species is grouped with the preceding in the table, the outline of prothorax behind the tubercle being decidedly concave, but the tubercle itself is very nearly rounded, and the insect resembles the following species in form. The color and coarser punctuation will, however, distinguish it from *subpilosa*, its nearest cousin, in the next group.

A. pinguis Lec., S. M. C. No. 264, 1873, p. 210.
Length 9 mm. = .36 inch. *Hab.*—Cal.

"The punctures of the basal half of the elytra are arranged so as to give the appearance of faint longitudinal stripes, of which the inner one runs obliquely forward towards the humerus, so as to tend to unite with the others" (LeConte).

This species is at present represented by a unique in Dr. Horn's collection.

A. tumida Lec., Ent. Rept. 1857, p. 63; *lugens* Lec., l. c.; *fusca* Lec., l. c.; *californica* Lec., J. A. P. ser. 2, I, p. 101; *subcyanea* Lec., Ent. Rept. p. 63; *mollipilosa* Lec., Proc. Ac. Phil. 1860, p. 321.
Length 7—12 mm. = .28—.48 inch. *Hab.*—Oreg., Col., Nev., Cal.

This species varies in color from black, partly or wholly fuscous or testaceous to blue, and also considerably in the amount of pubescence. The forms described by Dr. LeConte are inseparable and were all referred by him, in 1873, to *tumida*. The name it will be noted is not the earliest, but the most descriptive.

A. viola Lec., Proc. Ac. Phil. 1860, p. 321; Horn, Trans. A. E. S. xii, 1885, p. 180.
Length 11 mm. = .43 inch. *Hab.*—Oreg., Cal., Nev.

Similar to *tumida*, but differs as follows: "color violet-blue, legs and antennæ black, surface clothed with short, black, erect hair. The elytra are more densely punctate, and the thorax rather less so than in *tumida*" (Horn).

A. longicornis Kby., 1837, Fn. Bor. Am. p. 185; Lec., J. A. P. ser. 2, I, p. 321.
Length 9—11 mm. = .36—.44 inch. *Hab.*—Cal., Col., Wash., Oreg., "65°" (Kirby).

Elytra usually black vittate with yellow; legs yellow or black. Varies all black, or all testaceous, suture black, or as in *marginalis* (Lec., Ent. Rept. p. 28), elytra testaceous, margin black.

A. vincta Lec., Proc. Ac. Phil. 1861, p. 346.
Length 12—13 mm. = .47—.53 inch. *Hab.*—Cal., Oreg., Utah, Neb.

Closely resembles preceding in form, color and variations. Differs by head being oblique behind the eyes, hind impression of prothorax deeper and general form less robust.

A. ligata Lec., 1873, S. M. C. No. 264, p. 211.
Length 8—12 mm. = .32—.48 inch. *Hab.*—Mont., Wash., Col., Ks., Mo.

Closely allied to the preceding, but is distinguished from *longicornis* by less robust form and shape of head, and from both *vincta* and *longicornis* by the prothorax being less densely punctured, more shining and more constricted, especially at the base.

I am of the opinion that the three last-named species—*longicornis*, *vincta* and *ligata*, should be united under the oldest name, viz.: *longicornis* Kirby. I have quoted the characters given by Dr. LeConte for their separation, and I think the possessor of large series of either species will find them all in his set.

A. basalis Lec., 1873, S. M. C. No. 264, p. 211.
Length 10—11 mm. = .40—.44 inch. *Hab.*—Cal., Wash., Nev.

A slender species, proportioned somewhat like *longicornis*, but with the elytra more flattened and more densely punctured. The head is gradually narrowed behind the eyes, as usual, but is very distinctly constricted, though not strongly at base. The elytra vary somewhat in color, being often lighter, but the red color at base is always distinct on the umbones.

A. directa Newn., 1842, Entom. p. 71; 4-*vittata* Linn. (fide Hald.); *vittata* Sweder Vet. Ac. Nya Handl. 1787, viii, p. 198; Hald., Trans. Am. Phil. x, p. 65; 4-*vittata* Schön., Syn. Ins. i, p. 497; *pallida* Hald., l. c. p. 65.
Length 6—8 mm. = .24—.32 inch. *Hab.*—Pa., N. J., Vt., N. Y., Md., Ga., Ala., Ohio.

A. militaris Lec., J. A. P. ser. 2, i, 1850, p. 322.
Length 7—9 mm. = .28—.32 inch. *Hab.*—Or., Wash., Cal., Idaho.

Dr. LeConte describes this species as "black, with rather long ashy pubescence with a small red humeral spot." This form appears to be rather rare, and that usually met with is without the red spot and sparsely pubescent. It is often entirely black, but varies in color like the following, from which it may be known by the less slender form, particularly of the thorax.

A. subpilosa Lec., l. c.; *lupina* Lec., Proc. Ac. Phil. xii, 1860, p. 321; *dorsalis* Lec., Col. of Kansas 1859, p. 21.
Length 9—11 mm. = .36—.44 inch. *Hab.*—Wash., Oreg., Cal., Wyo., Mont., Utah, Kans., Rocky Mts.

Black, vittate with, or entirely testaceous; pubescence long and soft.

A. lisa n. sp.
Length 8 mm. = .32 inch. *Hab.*—Wash.

One specimen sent to Dr. Horn and marked by him "evidently new." The head is more strongly constricted behind than in any other *Acmæops*, but the general fascies is similar to the slender species like *longicornis*. Eyes deeply emarginate, head and mouth parts and first two joints of antennæ rufo-testaceous; prothorax black, constricted in front, strongly angulated at sides and hind angles prominent, but not produced, longer than wide; densely, not coarsely punctured, a small smooth space on disc near base. Elytra nearly parallel, very coarsely, almost confluently punctured at base, less coarsely at tip, which is bluntly rounded; rufo-testaceous, clothed with very fine golden pubescence. This pubescence is scarcely perceptible without a strong glass. Legs also rufo-testaceous, hind and middle tarsi and tibiæ and part of femora darker. Hind tarsi, with third joint deeply bilobed and densely pubescent beneath, the first and second joints almost glabrous. Beneath black, except head and center of prosternum.

A. falsa Lec., Proc. Ac. Phil. 1859, p. 80.
Length 6—7 mm. = .24—.28 mm. *Hab.*—So. Cal.

I have seen no variation in the color of this species, even in the extensive series in Dr. Horn's collection.

A. discoidea Hald., Trans. Am. Phil. x, p. 60; Lec., Agass. L. Sup. p. 235; Dej., Cat. 3 ed. p. 381. ✓
Length 6.5—8 mm. = .26—.32 mm. *Hab.*—L. Sup., Mich., Pa., N. J., N. Y., Mass.

This also is a constant species; the red color may entirely encircle the black on the elytra, but is never more than a narrow edge, and it is never missing at the base.

A. proteus Kirby, 1837, l. c., p. 186; *sublineata* Hald., l. c. p. 60. ✓
Length 6—9 mm. = .24—.36 inch. *Hab.*—Pa., L. Sup., Mich., Wash., N. Y., H. B. T.; Col., Or., Wis., Mont., N. Mex., Kans. Can., N. H., Mass., Labrador. "54° 60°" (Kirby).

The coloring varies from black to testaceous in every degree. The form described as *gibbula* by Dr. LeConte differs by the lateral elevations of prothorax being less prominent and cannot be separated from the typical form.

A. pratensis Laich, 1784, Verz. Tyr. Ins. ii, p. 172; Muls., Col. Fr. 2d ed. p. 492, and many other descriptions in European publications; *strigilata* Fab., Ent. Syst. i, 2, p. 341; Lec., Agass. L. Sup. p. 325; J. A. P. ser. 2, i, p. 323; *semimarginata* Rand., Bost. Jour. ii, p. 20; *longiceps* Kirby, l. c. p. 187; *fulvipennis* Mann., Bull. Mosc. 1853, iii, p. 251.
Length 6—8.5 mm. = .24—.34 inch. *Hab.*—Kenai, Col., Mont., Mich., "54° 65°" (Kirby), Anticosti, N. Mex., Ks., Or., Me., L. Sup., Vanc., Wyo., Nev.

Varies greatly as indicated in table. The very long mouth and front make this a very remarkable species.

PIODES Leconte.

P. coriacea Lec. J. A. P. ser. 2, 1 p. 318; Ent. Rept. 1857, p. 62.
Length 19 mm. = .75 in. *Hab.*—Oregon.

Black piceous, somewhat shining, head and thorax very closely rugosely punctate; elytra rugose.

"The whole appearance of this insect is that of a *Prionide;* it differs, however, by its immarginate thorax and conical anterior coxæ. Eyes scarcely prominent, mandibles rather long edentate, antennæ scarcely longer than head and thorax; thorax wider than long, very densely rugosely punctured, dorsal line finely impressed. Elytra twice as wide as thorax and half longer than wide, truncate at base, dilated a little behind the middle, rounded at apex, densely rugose with a few scattered punctures."

———o———

Dr. Horn has kindly called our attention to an error in the bibliography of *Pachyta*, viz.: *P. rugipennis* should read Newn. Zool. ii, p. 476; Lec., etc. (not Lec. Newn. ms.). This had been already pointed out by Dr. Horn (ENT. AM. i, p. 6, and note 14, p. 9), and stands correctly in Henshaw's List.

It should be understood that Dr. Horn's work on *Anthophilax* ends with his signature. There is a good colored figure of *A. mirificus* under the name *Pachyta costaricensis* Bates, Biol. Cent. Am. v, p. 277, pl. xxi, fig. 1.

———o———

I am indebted to Mr. Samuel Henshaw for many of the localities above given and following additions to those given in last numbers.

Agallissus gratus Hald. (not Lec.), Proc. Ac. 1853, vi, p. 363; N. Mex.
Atimia confusa Cal., Mass.
        dorsalis Guadaloupe, Id., S. Cal.
Distenia undata R. I., La., S. W. Va., Ga., Tex., Mich.
Desmocerus palliatus Can. W., N. Y., Ga., Mo., Wis.
            auripennis Or.
Necydalis mellitus Can. W., N. Y., Ga., Mo., Wis.
Ulochætes leoninus Vanc., Ft. Crooke.
Encyclops cœruleus Me., N. H., Mass., Pa., Wis.

(To be continued.)

The mosquito is to have a new lease of life! The Lamborn prizes have been awarded to those who most gracefully said that the Dragonflies couldn't master him. We said the same thing long since and got no prize either!

—III—

THREE NEW SPECIES OF COLEOPTERA.

RY J. J. RIVERS.

Amblychila baroni n. sp.—Form graceful; above wholly of a subdued resinous black; beneath shining black. Head subquadrate, with two punctures distant from each other and situated just behind the first or clypeal suture; two other punctures are behind the the second or frontal suture, but these punctures are firmer and closer together and nearly central; on the vertex near the eye is a triangle of three punctures. Thorax strongly convex, slightly longer than wide when looked at from above, but exact measurement of the anterior margin, through its great convexity, shows it to be greater than its longitudinal measurement; the side margins narrow from the front to the hind angles, in a gentle curve where they end in a transverse constriction that involves the hind margin, though it is raised above the constriction; the pronotum is produced in the middle on the front margin, and it is extended in the middle of the hind margin; hind angle subacute; a fine longitudinal impressed line, which does not reach either the front or hind margins. Elytra twice as long as wide, convex; flattened upon the central area; a series of well formed imbricated punctures and representing about sixteen broken rows; at the base a few of these imbrications become connected forming a short ridge or keel, while some others have developed into a mucron overhanging a puncture, or else forming a slight elevation between punctures; the whole becoming less asperate towards the apex. The acute margin extends from the basal angle about two-thirds and becomes obsolete; it is formed of a narrow carina slightly interrupted, and it is accompanied on its upper side by a row of fine punctures the acute and real margins are nearly parallel, and the interval between them is ornamented by four rows, much broken, of mucronate punctures like those on the elytra. Length 1.00 inch; 25 mm.

One specimen ♀, found by Mr. Oscar F. Baron, in Pantano County, Arizona, after whom I have great pleasure in naming this insect.

The above insect is certainly not easily confounded with any other North American species; Picolomini's example is conceded to be a varietal form of Say's *A. cylindriformis*, and the great size and profuse ornamentation in *A. cylindriformis* will alone be sufficient to separate it from *A. baroni.*

Cychrus (Brennus) oreophilus n. sp.—Form broad, flattish convex, with beautiful outline, prothorax dull black, elytra moderately shining black, beneath shining black. Head proportionate, front nearly smooth, with a well marked depression inside orbital ridge; genæ doubly notched. Thorax wider than long, widest across the foremost third, then decreasing sharply and obliquely to the hind margin, which is much contracted between the angles; in the oblique side margin there is, in some examples, the faintest indication of a sinuation; hind margin truncate, angles acute: at the base is a transverse impression, out of which grows a central depressed line reaching near to the front margin. Elytra with thirteen equally formed striæ, coarsely punctate after the style seen in *mimus*, the confused striæ at the sides number about five, and are of a net work pattern; the inflexed portion is smooth with faint punctures; the acute margin is sharply defined and the disc is slightly flattened.

Received from Shingle Springs, Eldorado County, California.

This has been confused with *C. obliquus*, but its less convexity, the finer puncturings and intervals, and the non-interrupted striæ of the elytra, easily distinguish it. The greater width of the thorax in contrast with the narrowness at the hind margin, it having the most oblique side margin of any known *Cychrus*, and still further the black without the least semblance of purple additionally characterize it.

It belongs to group 3, section 13, of Horn's "Synopsis of the Species of Cychrus inhabiting Boreal America."* It should be placed just before *striatus*.

The home of the species is in the Foot-hills of Eldorado Co., California.

Necydalis barbaræ n. sp.—Form large, robust; color chestnut-brown to pitchy-black. Head rugosely punctate and with a well defined frontal channel. Thorax with lateral protuberance, and with two depressions above, dorsal channel nearly obliterated, boldly constricted both before and behind. Elytra flat, finely rugosely punctate, slightly depressed on disc, sutural margins perfect, ending in a slight projectian; there is, however, a continuous margin around the apex, which reaches to the humeral angles; tip truncate, not convex, as in the other species. Size 22 mm. = .87 inch.

Habitat.—Santa Barbara, Cal. Collected by Oscar F. Baron.

A BIT OF HISTORY.

BY PROF. C. H. FERNALD.

In the "North American Entomologist," vol. i, p. 102 (1880), I expressed the desire to have the date of Zeller's Chilon. et Cramb., definitely determined, so that we could know positively whether Walker's or Zeller's species should take precedence. In the same place I published an extract from a letter from Dr. Hagen, giving his reasons for believing that Zeller's paper was published before Walker's work on the Crambidæ.

Early in 1881 I wrote to Prof. Zeller, himself, asking for the date of publication of his work on the Crambidæ, but he did not answer that part of my letter. My copy of Zeller's Crambidæ is one of the separata, and gives no clue to the date beyond the year,

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* Trans. Am. Ent. Soc. vii, December, 1878.

1863, but Prof. J. B. Smith kindly loaned me his copy for examination, and this contains the rest of the work. So conclusive did the evidence appear that Zeller's paper antedated Walker's, that I published an account of it in ENT. AMER. vol. v, p. 215, along with the correct dates of publication of several of Walker's works.

Mr. Meyrick wrote me soon after that he had seen a copy of Zeller's paper with "ed. July, 1863," on the title page in Zeller's own hand writing. I had previously seen a copy in Berlin with the same words, said to be Zeller's hand writing, but the evidence from Prof. Smith's copy was so conclusive that I felt sure there must be some mistake in the Berlin copy.

In the "Entomologist's Monthly Magazine" for April, 1890, p. 111, Mr. Meyrick has published a note in which he expresses doubts of my conclusions because of the date given in the copy mentioned above. I am free to confess that I felt quite uncertain about the matter when I learned that two copies, at least, contained the same date of publication—July, 1863, but Mr. Stainton has added to the above note of Mr. Meyrick some extracts from letters received from Zeller which settle the matter beyond all doubt. I give here the last two:

"Meseritz, 21st June, 1863.—Next week the printing of my Crambiden will be finished. I am now busy with the Index and list of Errata."

"Meseritz, 21st July, 1863.—Herewith you will receive some separate copies of my Crambiden. The reason for the date of publication being *written* is that the year appears on the title of the 'Schulnachricht,' which remains here."

I hasten to correct the error into which I had fallen, and thank Messrs. Meyrick and Stainton for calling my attention to the matter, and for giving us the real facts in the case. This information is certainly very opportune, for it comes before the issuing of my work on the N. A. Crambidæ.

◆

Mr. Fletcher has sent us a slip from an Australian paper in which is treated at some length a little *Capsid*, thought to be undescribed, and very injurious to vegetation. Among other characteristics—"when the insect is in repose the antennæ are doubled under the body betweeen the legs, but when piercing the fruit they erect and straighten out the serrated weapons, which are sharp pointed, and exert their strength in piercing the stem or fruit. The attacking antennæ are covered at intervals with a very minute capillary substance, the use of which we are unable at present to define, though it may aid in the process of suction."

SOME APPARENTLY NEW NOCTUIDÆ IN THE COLLECTION OF THE BRITISH MUSEUM.

BY HENRY EDWARDS.

During my stay in London, two years ago, I was enabled, through the kindness of Mr. A. G. Butler, to examine the large number of Noctuæ and Geometridæ collected some years ago in Southern Oregon and Northern California by Lord Walsingham, and I recognized as entirely new to me, and I believe to science, the following species. I have little doubt that a more lengthened and careful examination than I was able to make would result in the discovery of many other uncharacterized forms, particularly among the Geometridæ and Pyralidæ. Had I returned to London the following year, as it was my intention to do, I should have taken with me some types for comparison, and would have done my best to work up the whole series, but that pleasure has been denied me, and I therefore think it best to place on record the descriptions of those I did examine.

Herrichia cervina n. sp. Primaries reddish fawn color, ochreous at the base, with median band of a darker shade, narrow on internal margin, much widening on costa and enclosing the round reniform and subreniform, which are both bordered with ochreous. Behind the median band is a broad paler shade, clouded with darker fawn color and encroached upon by two sharp teeth proceeding from the brown submarginal band. The paler shades are mottled with darker fawn color. Secondaries dusky fawn color, with the fringes of both wings reddish fawn. Thorax and abdomen concolorous. Underside of primaries dusky fawn, costa and margin reddish, with an indistinct median waved line, which is continued on the secondaries, the ground color of which is redder than that of the upper wings. Discal spot distinct. Abdomen, thorax and legs reddish fawn. Exp. wings 20 mm.

Four specimens. Mt. Shasta district.

I place this insect in Mr. Grote's genus, as it appears to me to be, at any rate, very closely allied to it, bearing, as it does, a strong superficial resemblance to the well-known *H. mollissima.*

Annaphila casta n. sp. Allied to *A. diva* Gr. Primaries brownish black at the base and for about one-half of the wing, the brown space being mottled with bluish scales. The dark half of the wing is interrupted quite obliquely behind by a broad, clear white band, encroached upon anteriorly in the middle by a small brown point from the brown basal space. Otherwise the anterior edge of the white band is quite even and runs directly from the exterior third of the external margin to the costa. The posterior margin of the band is clouded at the external angle with dusky. In the middle is a large circular brown spot, and a smaller one above it, triangular in shape, representing the reniform and subreniform. The apex of the wing is broadly filled up with brownish, dotted, as is the base, with bluish scales. The secondaries are clear chalk-white, not creamy, as in *A. diva*. The marginal band is broader and more even on its edges than in that species, and the base of the wing is more densely filled up with black. Beneath the ground color is wholly pure clear white, and not yellowish, as in *A. diva*. On the apical margin of primaries is a heavy blackish patch containing a series of six sagittate, bluish white spots; before this the white band of the upper side is repeated with a small black linear and one roundish discal spot, and then a blackish band widest on costa. The base is white, with a bluish tinge. The secondaries have the marginal band of the upper side repeated with small bluish white patches, while the base is marked by a bluish white cloud, enclosed by black hairs, broadening into a spot on the costa. The thorax above is concolorous with the base of the wings. Abdomen brown at base, becoming gradually white towards the tip, the segments being indicated by narrow white bands. Below, the thorax, abdomen, legs and palpi are clear pure white. Average expanse of *diva*, ten examples, 17 mm.; *casta*, ten examples, 21 mm.

Oregon. Camp No. 9.

There is no doubt as to distinctness of this species. The collection contained many specimens of *A. diva* for comparison, and though resembling each other, it would be impossible to confound the two forms.

Euclidia annexa n. sp.—Primaries slate-brown. A little before the middle begins a brown mark which is remarkably like that in the well-known *E. mi* of Europe. It is almost even on its anterior edge, scarcely touching the internal margin, but there slightly rounded and curving upward into a deep tooth in the middle, broadening along the course of the median nerve and running up to costa, where it is joined by another longitudinally-oblong brown patch not reaching to the internal margin. These patches are bordered by a pale line, and in the larger patch is a distinct black dot. On the costa subapically is a greenish brown patch, and the external margin is also brownish, with a paler anterior shade. The secondaries are dusky slate color, with two very distinct ochreous waved bands, and a patch of the same shade in the middle near the costa, enclosing a brown discal spot. Abdominal margins dusky. Underside wholly pale ochreous, with the margins, two waved bands, and discal marks brownish black. Thorax and abdomen above wholly brown-black, except the tip of the latter, which is ochreous. Beneath wholly ochreous. Expanse of wings 30 mm.

Six specimens, Rouge River, Oregon.

◆

It has been claimed that "sugar" is not attractive to moths in tropical countries, and that quite different bait must be used. Dry codfish and other strong smelling substances are used with success, and recently I learned of quite a novel attraction; it is simply the collector's shirt that he has had on all day when hard at work and which is said to be rather superior to anything else as bait.

NOTES AND NEWS.

Such phantastic stories about the prices of rare Lepidoptera spring up at intervals in our entomological contemporaries that a line should be drawn somewhere. I admit that as much as £20 to £30 will be paid in the English markets for an insect, but only when it is a unique and has been so far found but once.

The rarity of *Teinopalpus imperialis* ♀ has been overrated. Within the last two years more than twenty females have been obtained, and the price ranges now from about $25 to $40, according to the size and state of the insect. The main collecting ground for it is Tiger Hill, 8500 feet high, southeast of Darjeeling, Himalayas, but lately it has been caught likewise in neighboring districts.

* * *

It is simply wonderful how some of the Lepidoptera are "protected," *i. e.*, protect themselves successfully against the attacks of birds, bats, lizards, etc., by a peculiar odor which they emit. Prominent East Indian collectors: Doherty, Möwis, Hartert and Nicéville, have lately given us many points about it.

Hartert says: "Few people, even among those who have collected in the tropics, know by own experience the pungent smell which many Lepidoptera emit. There is an idea that the smell is only peculiar to the males and serves them for making themselves agreeable to the females. This rule is not without an exception, for among a certain *Delias* of Upper Assam, which was endowed with a very strong musk smell, I found a few smell-bearing females.

Many of the large *Papilios* emit a faint smell of musk, most of the *Elymnias* bear a weak, but pleasant perfume, and the males of *Ornithoptera rhadamanthus* and *ruficollis* carry a faint, unpleasant smell. *Lethe mekara* Moore, of Assam, smells considerably like violets, but the most remarkable instance is given by the extremely rare Hesperian *Calliana pieridoides* ♂, which Doherty and I obtained in a few examples in Assam during October. The strong smell of this beautiful insect excels charmingly any perfume known to me, and reminds one of the aroma of the flowers of Heliotrope. The smell of the males of *Euplœa* is unpleasant to me, but liked by some of my colleagues."

So far Hartert. Doherty wrote me about the same, only adding that the papers in which he had folded *C. pieridoides* retained the pleasant odor for a number of hours after death.

B. Neumoegen.

PREPARATORY STAGES OF ARCTIA DOCTA Walk.

BY HARRISON G. DYAR.

EGG.—Conoidal, the base flat, smooth and shiny. Color pearly white, or pale yellow. They are not fastened to a surface as is usual, but appear to be laid loosely, perhaps some adhering together. Before hatching, the orange-colored head of the included larva is seen through the transparent shell at the summit of the egg and the black larval hairs curved spirally around it. Duration of this stage eight days.

FIRST LARVAL STAGE.—The head and cervical spot are semi-transparent pale orange, the eyes black. Body pale whitish, with about eight warts per segment, blackish, producing long, white and black hairs. Length 2 mm. Duration of this stage three days.

SECOND LARVAL STAGE.—Head testaceous, but the eyes and jaws brown. The body is similarly colored with the head, but paler, the warts large and blackish, bearing black hairs. Length about 4 mm. Duration of this stage three days.

THIRD LARVAL STAGE.—Head testaceous; the eyes, jaws and two large spots on the vertex, blackish; a few hairs. Body brown, the subdorsal space nearly black, with a pale whitish dorsal line. The black warts produce short black hairs and a few long pale ones. Length of the larva 8 mm. Duration of this stage four days.

FOURTH LARVAL STAGE.—Head black and shining. Body dark brown, nearly black dorsally, leaving a pale, interrupted, dorsal stripe. Warts black, arranged as in the mature larva and producing black hairs, with a few longer, paler ones. Feet black. Length 10 mm. Duration of this stage five days.

FIFTH LARVAL STAGE.—Head black, but paler about mouth and behind the eyes. Palpi pale. Body black, paler on the venter, with an interrupted reddish dorsal line. The abdominal feet are pale, and the spiracles reddish; otherwise as before. Length 15 mm. Duration of this stage eight days.

SIXTH LARVAL STAGE.—Head black, slightly reddish centrally and paler at the sides; the plates above the mouth are whitish; jaws black, and palpi pale, with a black ring, the last joint reddish. Body velvety black with an interrupted dorsal red stripe absent on joints 2, 3, 4 and 13, forming a row of eight red spots, rounded posteriorly aud pointed anteriorly. Thoracic feet black; abdominal black with the claspers pale brown. Hairs black, a few longer white ones posteriorly while those from the subventral warts are tawny reddish. The hairs are stiff and spiny, about 5 mm. long and are not abundant enough to hide the body even just after moulting. There are a few black hairs on the head and a fringe of short hair overhangs it. The warts are large, dull black, and arranged exactly as in the larva of *Arachnis picta* Pack.* Spiracles white. Length of the larva at maturity 45 mm. Duration of this, the last larval stage, eleven days.

Cocoon.—A slight netting of threads drawing together any loose material and containing no hairs, for these remain on the cast skin. The operations of forming the cocoon and preparation for pupation occupy five days.

Pupa.—When first formed the pupa has the thorax, head and cases pale transparent yellow, the abdomen white, purple between the segments with a brick-red dorsal interrupted line and several rows of darker red spots on the sides and venter. The cremaster is broad, but very short, with four spines of about equal length; color pale brown. Soon the whole pupa turns shining black and becomes covered with a white bloom. Cases creased; thorax and abdominal segments punctured. Duration of this stage twenty-eight days.

Food-Plants.—The larvæ seem to be practically omnivorous, at least for tender plants growing near the ground. I carried some from California to the East and fed them on the native plants by the way. They reached maturity in Florida on the food-plant of *Dilophonota ello*. During all the larval stages they feed only at night, and are very lively in their attempts to run and hide if disturbed. Larvæ from Los Angeles County, Cal.

EXCURSION.

The committee from the Brooklyn, Newark and Philadelphia Societies have decided upon Upper Jamesburg, N. J., as the place where the field meeting of the entomologists of the three cities and neighboring points is to take place on the 4th of July next. Jamesburg is on the Amboy Division of the Pennsylvania Railroad, and may be reached from New York *via* Perth Amboy and Rahway at 9.10 a. m., Newark at 9.36 a. m.; *via* Monmouth Junction, New York 7.20 a. m., Newark 7.50 a. m. Leave Philadelphia from Broad Street at 6.50 a. m. *via* Camden at 7.10 a. m.

The 7.20 a. m. from New York *via* Monmouth Junction meets the 6.50 from Philadelphia at Monmouth Junction, and this train is recommended, as it will bring the party into Jamesburg at the same time. Excursion fare about $2.10 from New York and Philadelphia. All the entomologists desiring to attend will be heartily welcomed, whether members of the societies organizing the excursion or not, but in order that the necessary arrangements for creature comforts can be made, all those expecting to take part in the field-meeting will please notify one of the members of the committee as soon as convenient. Further information may be obtained from the committee:

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* See Ent. Amer. vol. vi, p. 74.

Dr. D. M. Castle, 2007 Arch St., Philadelphia.
C. P. Machesney, 65 Broadway, New York.
C. H. Roberts, 235 W. 122d St., New York.
J. B. Smith, Rutgers College, New Brunswick, N. J.
H. W. Wenzel, 1115 Moore St., Philadelphia.

SOCIETY NEWS.

Entomological Society of Washington.—March 6, 1890.—Mr. Schwarz exhibited and remarked upon the following species of Coleoptera, which are new to the fauna of North America: *Lathridius* (*Coninomus*) *nodifer* Westwood; *Actinopteryx fucicola* Allibert, *Arrhipis laneri* Guerin and *Probatius umbratilis* Duval. He also showed specimens of *Temnochila hubbardi* Léveillé and *Teretriosoma hornii* Lewis, recently described in European journals from the semi-tropical region of Florida. He finally drew attention to Dr. Horn's recent Revision of the North American species of *Ochthebius*, and spoke of the geographical distribution of these aquatic beetles. Discussion followed by various members.

The Secretary presented a note on a Dipterous larva infesting the seeds of Xanthium. He had found these larvæ at Manhattan, Kansas, and during the past winter in the District. Drawings were exhibited illustrating the larva and the nature of its work.

The Secretary also presented a short note on the food-habits of *Psiloptera drummondi.*

These notes were discussed by Schwarz, Townsend and Howard.

Mr. Townsend read a paper entitled "Notes on Acridiidæ in Michigan," which related more particularly to dates of appearance and habits.

C. F. Marlatt,
Recording Secretary.

Brooklyn Entomological Society.

Meeting April 1, 1890.—Fifty persons present, Rev. George D. Hulst presiding. Minutes of last meeting read and approved. Prof. Smith, of committee to arrange with Philadelphia and Newark Entomological Societies for a joint field meeting, reported that Jamesburg, N. J., on July 4, 1890, had been informally suggested, and that a stated meeting of the several committees would be soon held, at which a determination would be reached. Mr.

L. A. Best, of 125 Sixth Avenue, N. Y., Mr. Henry E. Hallowell, of No. 789 Monroe Street, Brooklyn, and Mr. Frank H. Johnson, of No. 168 Hancock Street, Brooklyn, were elected members of the Department.

Prof. Hooper reported informally that the natural history collections of the late John Calverley had been secured for the Institute through the kindness of his son, Mr. William Calverley, and that the entomological portion of the collection would be placed in charge of this Department—such portion being complete as to nomenclature and North American species in respect to Lepidoptera and Coleoptera to the year 1870, when Mr. Calverley ceased to collect. The Secretary was thereupon directed to express the thanks of the Department to Mr. William Calverley therefor.

Prof. John B. Smith introduced scientific discussion by an explanation of the structure of the anal tuft of *Euchœtcs egle*, which was arranged upon pleats or folds, following this by remarks on some peculiar and interesting structures of insects assisted by lantern views.

The first series of views represented variation in the head and mouth parts and ovipositors of several species of Diptera, including *Hœmatobia serrata* (imported horn fly, injurious to cattle), *Stomoxys calcitrans*, house fly, and *Eristalis tenax* or drone fly.

The second series represented modifications of the ovipositor as a means of defense as shown in the stings of *Polistes* and *Bombus*, or as a tool for cutting vegetable tissues as shown in the saw-like instruments of the Tenthredinidæ.

The third series indicated the resources of larvæ of limited silk spinning capacity, as those of *Halesidota caryœ* in the construction of their cocoons, by using the hairs with which their bodies were clothed, and which cohered by reason of numerous hooks with which each hair was furnished. A modification of these hairs was shown in the spines of the saddle-back caterpillar, *Empretia stimulea*, which were hollow and tapered to a point, which readily broke off in any substance pierced by them, the fluid secreted at the base of the spine entering the wounds made by them and causing the smarting sensation experienced.

The next series showed portions of the external structure of several species of Coleoptera, including the leg of a *Dytiscus* (the hairs thickly studding the joints resolving themselves under the microscope to filamentary bodies, crowned with flat, circular disks, or suckers, calculated to unite the insect firmly to any desired object) and the star-like punctures of the elytron of *Cupes capitatus*.

The last series represented parasites of the surf-duck, pigeon and cow.

Meeting May 6, 1890.—Twenty persons present, Rev. Geo. D. Hulst presiding. Mr. Lendal V. Hallock, Creedmoor, N. Y., and Dr. Samuel Russell and Mr. George A. Street, Brooklyn, N. Y., were elected members of the Department. The election of officers was taken up and the officers of last year were re-elected save the President and editor, election of which went over until the June meeting. Mr. Weeks read extracts from a pamphlet issued by a dry-goods house in Brooklyn, giving methods of destroying "The Moth, moth miller and moth-fly" as an evidence of the necessity for the dissemination of entomological knowledge.

A. C. Weeks,
Recording Secretary.

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Subscriptions and other business communications should be sent to the treasurer.

Insects for identification, or as donations to the collection of the Society, go to either of the curators.

ENTOMOLOGICA AMERICANA

VOL. VI. BROOKLYN, JULY, 1890. No. 7.

NEW SPECIES OF TÆNIOCAMPINI.

BY JOHN B. SMITH.

Since the publication of my Revision of some of the Tæniocampid genera (Proc. U. S. Nat. Mus. xii, 455–496, 1889–90) a number of species which merit description have come into my hands. It is matter of regret that a monographic work should be so soon made incomplete by describing new species, but there seems to be no help for it in the present state of our science. From the appearance of collections coming in, I believe that fully one-third more than are at present known will be added to our list of *Noctuidæ* in the next five years, and that our lists then will be very much different in arrangement from those at present in use.

Tæniocampa carminata sp. nov.—Head and thorax a luteous brown, with a more or less evident carmine washing, most distinct in the female of the specimens before me. Primaries: ground color rather a pale luteous, more or less completely suffused with carmine. In the specimens before me the ground color is faintly visible through the centre of the wing only in the female; in the male all the interspaces up to the terminal space are distinctly luteous, while the latter space and the veins are carmine. The usual maculation is obsolete. Secondaries blackish fuscous with yellow fringes. Beneath yellowish fuscous, with a more or less obvious reddish suffusion. Expands 1.40 inches; 35 mm.

Hab.—Colorado (Bruce).

The vestiture is entirely hairy, forming no thoracic tufts. Antennæ of male lengthily bipectinated, of ♀ simple. The primaries have the apex rectangular, the outer margin rounded, and thus the species belongs to the *rufula* group, from which it differs in the distinctly roughened front, which is not, however, protuberant. The species is unique in appearance and unlike any other of our species in color. Both sexes are before me and other specimens are in collections, all from Mr. Bruce, to whose kindness I owe a number of fine species.

Tæniocampa curtica sp. nov.—In color of head, thorax and primaries, varying from a reddish clay color to a distinct red-brown, somewhat powdery. The transverse lines are very variably distinct, sometimes all save the s. t. line indefinite. When present they are as follows: basal line narrow, pale, irregular, without defining margins. T. a. line pale, almost upright, angulated on the veins and there also black marked, else not defined save in the costal space. T. p. line pale, sinuate, of the usual form, outer margin defined by a slightly darker shade, which is emphasized by a series of venular points, behind which are small pale dots. S. t. line always distinct, pale, but slightly irregular, preceded by a distinct darker shade not broken up into spots in the specimens before me. Veins black marked through terminal space. Orbicular concolorous, small, round, indistinctly pale ringed, scarcely definable in some specimens. Reniform moderate in size, constricted centrally, narrowly pale ringed, inferiorly black filled; a dusky shade from costa between the spots, obliquely outward to the blackish filled part of reniform. Secondaries soiled whitish at base, blackish outwardly. Beneath reddish powdery over whitish, with a common black exterior line breaking into dots on secondaries and with a distinct discal spot on each wing. Expands 1.20—1.25 inches; 29—30 mm.

Hab.—Sierra Nevada, Cal.

A considerable number of specimens has been before me from Messrs. Edwards and Neumoegen, all agreeing save in distinctness of maculation. The species belongs to the *oviduca* group of the genus, with very decided leanings to the *incincta* type in wing form and maculation. The apices of primaries are rectangular, but scarcely acute or produced, and the prominent s. t. shade recalls *incincta* quite strongly. The antennal pectinations are shorter however, and the wings are less frail; the species as a whole stouter in habitus. The vestiture consists of flattened hair and scales.

Tæniocampa addenda sp. nov.—General color of head, thorax and primaries red-brown, adding either a grayish or luteous tint; maculation variably distinct, almost entirely obsolete in one specimen, while in another it is very distinct. In the latter the basal line is marked only by a venular dot; t. a. line outcurved, lunate between veins, darker, preceded by a slightly paler shade. T. p. line very even, slightly sinuately and nearly parallel with the outer margin, consisting of a series of dusky lunules, beyond which is a series of short venular streaks terminating in a pale dot. S. t. line somewhat irregular, marked by a blackish preceding shade, which makes the terminal space seem paler. A series of blackish terminal lunules. The median space is blackish filled below the costal region and the s. t. space is well powdered with blackish. Orbicular small, round, black filled. Reniform moderate, upright, slightly constricted medially, black filled. Secondaries smoky fuscous or yellowish, with black powderings. Beneath reddish powdery with common, incomplete exterior line, and discal spot on all wings. From this fully marked form we have the change to an almost uniform reddish or grayish brown with the maculation almost entirely wanting. Expands 1.24—1.32 inches; 31—33 mm.

Hab.—California.

Both sexes from Mr. Neumoegen's collection are before me. The species belongs structurally to the *incincta* group, and is allied to *pectinata* and *terminata*, from both of which it differs obviously, most nearly resembling the latter perhaps. The vestiture is hairy, antennal pectinations long. The median lines are quite approximate inferiorly.

Tæniocampa venata sp. nov.—Head, thorax and primaries bright reddish luteous, with more or less evident red-brown shadings, especially noticeable on the veins through the s. t. and terminal spaces. Basal space; powdery median space with a broad, brown shade between the ordinary spots, almost filling the space below. Basal line marked only by venular dots. T. a. line a single, brown line, slightly irregular, outwardly oblique and curved, preceded by an indefined paler, yellowish line. T. p. line darker red-brown, curved over and touching the outer margin of reniform, then evenly incurved below, followed by a paler line and over the cell by venular dashes. S. t. line paler than ground color, irregular, diffuse, indefinite. A dusky terminal line. Orbicular large, round, pale ringed, concolorous. Reniform large, kidney shaped, pale ringed and black filled. Secondaries smoky fuscous with ocher yellow fringes. Beneath reddish, powdery, with incomplete outer line and discal spot on all wings. Expands 1.50 inches; 37 mm.

Hab.—New York.

A single male specimen, in good condition, collected by Mr. Bruce, many years ago, and numbered 63. In structural characters this species agrees with *addenda*, but differs both in wing form and maculation. The latter recalls *incerta* quite strongly, but the pectinated antennæ at once separate it. The apices are not as pointed as in *addenda* and the outer margin is less curved. I have never seen anything to match this species, and do not think it can be readily confused with any of the described forms.

PERIGONICA gen. nov.

Eyes hairy; tibiæ not spinose; form robust; vestiture hairy; thorax with a somewhat indefinite and loose median crest or keel; palpi short, not exceeding front, slightly drooping; antennæ of male serrate and bristled, or pectinated. Wings large, primaries with apices prominent acute, outer margin somewhat excavated to middle, where it forms a distinct angulation.

Habitus of *Tæniocampa* or *Perigrapha*. From both it differs in the wing form, and this is the basis of the genus, which otherwise agrees fairly well with *Tæniocampa*, save in the thoracic crest. *Perigrapha*, which has this crest, has also a different wing form, and has the antennæ uniformly pectinated and longer than in the present genus.

Two species referable to the foregoing generic characterization are before me, agreeing in maculation to a remarkable extent, but differing in antennal structure very decidedly.

Angulata is a creamy-gray species in which the male antennæ are serrate and bristled—"brush like."

Fulminans is a larger, reddish form, in which the male antennæ are rather lengthily bi-pectinated. It is from Colorado, while *angulata* is from California.

Perigonica angulata sp. nov.—Creamy or luteous gray; head and thorax immaculate. Primaries with basal line evident, geminate; t. a. line geminate, outcurved, somewhat irregular and interrupted. T. p. line sinuate, inner line narrow, somewhat lunulate, followed by two series of venular dots. S. t. line narrow, pale, hardly distinct, nearly parallel with outer margin. A row of not quite terminal black dots. A distinct median shade band from costa between ordinary spots, outwardly oblique and invading the lower part of reniform, there angulate, and then parallel with and close to t. p. line to inner margin. Orbicular concolorous, moderate in size, round, vaguely defined by a slightly paler annulus. Reniform narrow, upright, somewhat constricted centrally, pale margined, inferiorly dark filled. These markings vary in the direction of obsolescence, one specimen before me being nearly immaculate and showing only tracings of the described maculation. Secondaries whitish, with a blackish outer marginal line and a distinct discal spot. Beneath powdery, with a black, complete, common outer line, and a black discal spot on all wings. Expands 1.48 inches; 37 mm.

Hab.—Sierra Nevada, Cal.

Both sexes from Mr. Henry Edwards. The variation is in the direction of obsolescence of maculation in the specimens before me: the peculiar double series of venular dots beyond t. p. line and the inception at costa of the median shade being the most permanent features.

Perigonica fulminans sp. nov.—Somewhat luteous brick-red, very even in color. Head and thorax immaculate. Primaries with all the maculation faint, scarcely legible. Basal line traceable, geminate. T. a. line single, narrow, dusky, outwardly curved. T. p. line geminate, sinuate, outer line a series of venular dots. S. t. line rather distinct, slightly irregular, pale, as a whole about parallel with the outer margin. A narrow median shade line from costa between the ordinary spots, outwardly oblique to and darkening the lower part of reniform, there angulated and then parallel with and close to t. p. line to hind margin. Orbicular moderate, concolorous, barely distinguishable by a faintly paler annulus. Reniform narrow, upright, medially constricted, annulate in pale, the inferior portion darkened by the median shade. Secondaries whitish, semi-transparent, with a dusky outer border. Beneath powdery, with an outer common line and discal spot on all wings. Expands 1.52—1.64 inches; 38—41 mm.

Hab.—Colorado.

Both sexes, collected by Mr. Bruce, in Mr. Neumoegen's collection and coll. Rutgers College. The specimens before me are nearly identical in color and markings, but judging from its ally I am persuaded that forms will be found in which the maculation will be as distinct as in *angulata*, and then the description of that species will answer for the present as well, so far as ornamentation is concerned. It is matter of interest that two species so nearly alike in color, wing form and habitus generally should differ so strongly in antennal structure.

◆

For mounting small specimens of Coleoptera, triangles or arms of gelatine will be found greatly superior to those made of card-board. The thin plates or sheets of gelatine used by photographers are very nice and even, and very cheap. They are rather thin, but two of them glued together make a good thickness. These triangles are so transparent as to be almost invisible, and specimens mounted thereon with Le Page's liquid glue will adhere readily and permanently. What is wanted now is a cheap punch that will cut the triangles neatly and of a regular and uniform size.

Santa Rosa, Cal. L. E. RICKSECKER.

Mr. Ricksecker's note is interesting, and he kindly sent me a sample of the gelatine plates. I found that they cut splendidly with a punch, and that the pins pierced easily and held tightly. I found also that the points curled in the sun and that they drooped when exposed to moisture. In cutting points I select a medium card-board and use punches of two sizes, but cutting the same length. The best punches I have seen do not make a clean cut, and even with a perfect scissors it is almost impossible to make a fine point that has not a right and wrong side. Mr. Wenzel has the best arrangement I have seen. He gets strips of card-board of uniform width, and, on a block of boxwood, cuts with a razor. This works rapidly, and the cut is clean and smooth, even the most slender point being absolutely true and without curl. Mr. Ricksecker's points look pretty, and if the gelatine could be made to repel moisture, they would be perfect.—ED.

ERISTALIS TENAX IN ENGLAND.

BY A. G. BUTLER.

In the May number of ENTOMOLOGICA AMERICANA Dr. Hamilton has an interesting article on the Pollenization of Chrysanthemums by this fly, and he appears to think that it confines its attentions to the flowers of these plants. In England *Eristalis tenax* is more attracted by the large annual Sunflowers and double Marigolds than by other flowers, but it certainly visits other flowers. Its resemblance to a honey-bee probably affords it a degree of protection, as some birds are undoubtedly suspicious of it; but, as the Buntings, including the American Nonpareil and Indigo-finch, the English Robin, Nightingale and Missel-thrush, the White-eared Bulbul and Leiothrix, seize and eat it without hesitation, there can be no doubt that very many are destroyed by insectivorous birds. I grow Marigolds partly for the purpose of attracting these flies, which I turn into my aviaries, and thus during September my birds get a considerable amount of insect food, which they would otherwise have to dispense with.

* * * *

Apropos to Dr. Hamilton's article in No. 5, of ENT. AMER., it may be of interest to know that I took scores (and could have taken hundreds) of specimens of *Eristalis tenax* on a patch of wild mustard growing in this county some ten miles back from the lake last September and October. I have specimens in my cabinet that I took in California in August. The fall flowers here on the prairie, wild mustard, the different asters and golden rods, and the large Compositæ are always attractive to *E. tenax*, as I have noticed for many years. O. S. WESTCOTT.

Additional Note.—It may be well to add that *Eristalis tenax* has been quite common in New York State for years past, occurring in early Spring, and more abundantly in the Fall, not only on Chrysanthemums, but on nearly every species of flower, both cultivated and wild, in bloom at these seasons. On account of the abundance of Compositæ at the time of its occurrence the fly is most often to be found on these flowers, but I am not inclined to believe that it is in any manner restricted to this order of plants. I have frequently noticed these flies flying about in the sun when the weather was so chilly that no other living insect was to be found abroad.

F. H. C.

THE GENUS DATANA Walker.

BY HARRISON G. DYAR.

I had originally prepared some notes on this genus for ENTOMOLOGICA AMERICANA, but in response to the request of Prof. Smith I have enlarged them somewhat to include all the species. Eight species inhabit the State of New York, and I include four others not found here.

In the following I give distinctive characters only when the species has been already well described, and a brief description of the larva, when known. I have not attempted to give a full bibliography, but give a reference for the original description, and one for the larva, the latter distinguished by an asterisk.

Datana angusii Grote and Robinson.

G. & R., Proc. Ent. Soc. Phil. vol. vi, p. 9* pl. 2, fig. 1.
Beutenmüller, Can. Ent. vol. xx, p. 135.*

Readily known by its dark smoky brown color, common to the whole insect both above and below. The lines are five in number, and are arranged as in the other species of this group (§ 1 of my table). They are variable in position and furnish no distinctive characters. The discal spots are often slight, the outer sometimes linear. The description by Grote and Robinson is most excellent.

The larva is black, the lines fine and colored light yellow.

Food-plants: Hickory, Walnut, Birch.

Datana ministra Drury.

Drury (as Phalæna), Exot. Lep. vol. 2, p. 25, pl. 14, fig. 3.
G. & R.. Proc. Ent. Soc. Phil. vol. vi, p. 11.
Beut., Can. Ent. vol. xx, p. 16.*

This species is of a pale yellowish brown with usual markings. The discal spots are usually absent, and sometimes also the fourth line. The hind wings are pale.

The larva has often been described, frequently the other species being confounded with it. It is black, with the cervical spot yellow, the lines sulphur-yellow, not confluent posteriorly.

Food-plants: various fruit trees, Linden, Oak, Elm, etc.

Datana californica Riley, MS.

Prof. Riley's description has not yet appeared, but I give a brief characterization in order that I may include the species in my table:

Exterior margin of primaries excavate between the veins. Thorax and abdomen nearly concolorous with the primaries, the thorax sometimes paler. The patch on the head and anterior portion of the thorax pale brown, with an ocherous tinge on head and collar, often contracted laterally at the middle of the thorax. Primaries pale testaceous, a slightly darker shade on the costal half, quite thickly sprinkled with brown scales. Discal spots usually present in the female, but rather obscure, fainter in the male; the outer spot elongate, the inner round, composed of brown and whitish scales, slightly elevated. Five light brown transverse bands and apical streak, the first curved, in some specimens dislocated a little at the costa, the rest nearly parallel; all but the fifth obsolete at the costa and the fourth often faint, especially in the male. The apical streak starts from below the apex, and is then angulated downward, in some examples nearly parallel to the fourth line, often with the upper part obsolete. Fringe brown. Secondaries very pale testaceous, unicolorous. Wings below as secondaries above, but primaries have a slightly darker tinge towards the apex and fringes. Expanse ♂ 44—45 mm.; ♀ 45—53 mm.

The species is close to *D. ministra*, but is distinguished by its pale, nearly uniform colored primaries, and pale secondaries.

Prof. Riley informs me that he intends to describe the larval stages when his description of the species appears.

From Santa Clara County, Cal.

Datana drexelii Hy. Edwards.
Hy. Edwards, Papilio, vol. iv, p. 25.*
Beut., Can. Ent. vol. xx, p. 57.*

As Mr. Edwards' description is wholly comparative, I give one in full:

Head and thoracic patch tawny brown, the latter darker posteriorly and sometimes constricted. This is a variable character; the rest of the thorax is concolorous with the fore wings. Abdomen pale reddish brown, the tip sometimes darker. Fore wings excavate between the nervules on the outer margin, pale yellowish brown, much the color of *D. ministra* and distinctly irrorate with dark brown scales, which are thickest below the median vein, inside the second band. The costal portion above the median vein and before apical streak is dull fulvous, contrasting with the rest of the wing and mainly lacking the irrorations. Five transverse dark brown lines as in allied species, somewhat variable in position and shape, the three central ones obsolete on the costa; a round central discal dot and the discal cross vein largely covered with dark scales. These two spots appear somewhat darker than the lines, while the second line runs beyond, through or nearly inside the outer discal spot. Fringe dark brown. Hind wings largely shaded with brown, but paler at the base; underside as in *D. major*. Expanse 45—55 mm.

The larva is black, joint 2 wholly yellow, the stripes citron-yellow and confluent posteriorly.

Food-plants: Witch-hazel and Huckleberry (*Vaccinium*).

Datana major Grote and Robinson.
G. & R., Proc. Ent. Soc. Phil. vol. vi, p. 12, pl. 2, fig. 3.
Dyar, Can. Ent. vol. xxi, p. 34.*

The male has the exterior margin of primaries nearly straight, the female slightly excavate between the veins. In this character the species approaches § 2 of my table, and consequently I place it last in § 1. It is distinguished by its large size, the distinct dorsal spots and the *nearly uniform* reddish brown color of both wings. I know of but one constant character to separate the moth from *D. drexelii* (viz., the fulvous costal shade of the latter), but the larvæ differ greatly.

The mature larva of *D. major* is black, the head, cervical spot and anal plates dark red; the body has rows of subquadrate spots bright canary-yellow or clear white.

Food-plant: *Andromeda ligustrina.*

A peculiarity of the larvæ is their separating and feeding singly after the last moult. Mr. Beutenmüller has shown me examples of the moth which were small, the costa unusually yellowish with the second band bent to pass inside the outer discal spot. He stated that they were raised from the characteristically spotted larva of *major.* It seems probable that they are a dwarfed form of *D. major*, arising from insufficiency of food in the larval state. If compelled to live together, after the last moult (as these were), the larvæ will not eat well and the moths would be small. The position of the lines is not constant in this species.

Datana palmii Beutenmüller.
Beut., Psyche, vol. vi, p. 299 (1890).

This species was described from Pennsylvania, but it also occurs in New York. It seems to be a mountain species, the localities so far known being Delaware Water Gap, Pa., and the Catskill Mountains, N. Y. It may be known by the following characters:

Head and thoracic patch cinnamon-brown, the former paler. The rest of the thorax is of the color of the fore wings. Abdomen pale testaceous, as in allies. Fore wings entire along the outer margin, but showing a trace of the excavations, dull pale lilac, rather thickly covered with dark brown irrorations, in the female almost obscuring the ground color between the first and fifth bands. Five cinnamon-brown bands, the color of the irrorations and apical streak as in allies, the first, second and fifth distinct, the others more or less obsolescent. The discal spots are just discernible, the outer the more distinct, much as in *D. integerrima.* Fringe cinnamon-brown. Hind wings rather pale, but tinged with brown. The underside gives no distinctive characters.

Mature Larva.—Head rather light orange-red, the mouth paler and jaws black. Palpi black, the base and two rings white. Scattered black hairs, width of head 5 mm.; cervical spot and anal plates orange-red, with a few short black hairs. Body black, with four lateral pale yellow lines, narrower than the intervening spaces, the upper two replaced on joint 2 by the cervical spot, and all somewhat broken on joint 13, barely reaching the anal plates. Three ventral lines, one interrupted by the bases of the legs on each side, the third in the center of the venter, interrupted on joint 13. The bases of the legs are orange-red and also corresponding spots on the legless segments. Thoracic feet black, abdominal with a black band outwardly, the anal feet nearly all black; a number of rather long whitish hairs scattered over the body.

Food-plant: *Vaccinium stamineum.*

Datana floridana Graef.
Graef, Bull. Brookl. Ent. Soc. vol. ii, p. 37.
Koebele Bull. Brookl. Ent. Soc. vol. iv, p. 21.*

This is described as "dark brown, with a purplish flush" on primaries. The third and fourth lines are obsolete, leaving but three lines. This species is close to *D. palmii*, and seems to differ only in the greater abundance of the brown scales, causing the fainter lines to become lost and the purplish color to be less distinct. A specimen kindly loaned me by Prof. Lintner and labeled "from Elliot, *Datana floridana* Graef, var. ♀ N. York," cannot be this species, but is *D. palmii.* The lines are all present, the ground color is distinctly of a lilac shade, and it only differs from my specimens of *palmii* in being of a slightly duller shade and in having the secondaries more heavily tinged with brown. The larvæ appear to differ. Mr. Koebele describes that of *D. floridana* as "black, with eleven parallel yellowish lines (he does not give their width); the head, the summit of the body segment, the anal coverings, and the summits of the legs, deep mahogany red. . . ."

Mr. Beutenmüller, in his table, gives the lines as wider than the intervening spaces (in *D. palmii* they are narrower, but not much so). The larva is unknown to me.

Datana modesta Beutenmüller.
Beut., Psyche, vol. v, p. 299 (1890).

This species is unknown to me. If the yellowish ocherous patch, mentioned by the describer, prove a constant feature, as it probably will, it will serve as a good distinctive character. The larva is unknown.

Kissimmee, Fla.

Datana integerrima Grote and Robinson.
G. & R., Proc. Ent. Soc. Phil. vol. vi, p. 12,* pl. 2, fig. 4.
Beut., Can. Ent. vol. xx, p. 134.*

Dark reddish brown, the lines edged by pale shades. The lines and fringe are concolorous with the brown irrorations that thickly cover the wing, and, in a specimen from Illinois before me, blend together between the first and fifth bands, but the pale shade remains. Hind wings pale, but shaded with brown. The larva is black, the lines white, the lower the wider, but often all are absent and the insect is black. Hair long, white, more abundant than in the other species.

Food-plants: Hickory, Black Walnut, Butternut.

Datana contracta Walker.
Walk., Cat. Brit. Mus. pt. 5, p. 1062 (1855).
G. & R., Proc. Ent. Soc. Phil. vol. vi, p. 14.*
Beut., Can. Ent. vol. xx, p. 134.*

"Luteous tawny." The lighter costal shade is rather more distinct than in its congeners. The lines and irrorations are nearly black, but the fringe is brown, contrasting with the bright color of the wing and distinctly of a different shade from the lines. The lines are indistinctly bordered by paler shades, caused by an absence of the irrorations which are not nearly so numerous as in *D. integerrima*. The discal spots are moderately prominent, concolorous with the lines. The larva is black, its cervical spot yellow, its lines broad, cream white.

Food-plants: species of Oak.

Datana perspicua Grote and Robinson.
G. & R., Proc. Ent. Soc. Phil. vol. iv, p. 489, pl. 3, fig. 1.
Hy. Edwards, Ent. Amer. vol. iii, p. 170.*

Readily recognized by its yellowish buff color and peculiar brown markings The central lines (lines 2, 3 and 4) are more or less obsolete, in one specimen before me only a trace left. The outer discal spot is very large and the apical streak long; the veins from the median down, between bands 1 and 5, are marked with brown. Hind wings very pale. The larva is black or red, with broad bright yellow stripes. Head and cervical spot black or red.

Food-plant: Sumach.

Datana robusta Strecker.
Strk., Lep. Rhop. et Hetero. pt. 14, p. 131.

Allied to the preceding, and marked after the same pattern. The species is larger and duller colored than *D. perspicua*, and the markings are more pronounced. The absence of the usual brown thoracic patch separates it from all species of the genus so far known. Larva unknown.

The species is from Texas.

The following table may be of some use in separating the species:

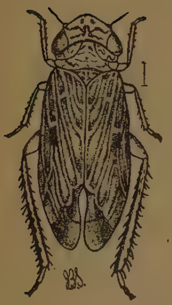
§ 1. Exterior margin of primaries excavate between the veins.
A. Color entirely smoky, or blackish brown . . . . . . **angusii** G. & R.
B. Color yellowish brown, or paler.
a. Discal spots faint or absent, size medium.
1. Color yellow-brown . . . . **ministra** Dru.
2. Color pale testaceous . . . . **californica** Riley.
b. Discal spots distinct, size large.
1. A distinct fulvous costal shade . . . . **drexelii** Hy. Edw.
2. Wings nearly unicolorous, tawny reddish brown . . **major** G. & R.
§ 2. Exterior margin of primaries entire.
A. Discal spots not large, inconspicuous, or absent.
a. Fore wings with more or less of a purplish or lilac color.
1. Fore wings dull whitish lilac, more or less covered with cinnamon-brown scales . . . . **palmii** Beut.
2. Fore wings dark brown, with a purplish flush . . . **floridana** Graef.
b. Fore wings without such color.
1. Thoracic patch ocherous . . . . **modesta** Beut.
2. Thoracic patch dark brown.
Fore wings dark reddish brown, lines and fringe concolorous. **integerrima** G. & R.
Fore wings luteous tawny, the lines and fringe not concolorous. **contracta** Walk.
B. Discal spots, especially the outer, very large and distinct.
a. Thoracic patch tawny brown . . . . **perspicua** G. & R.
b. Thoracic patch as pale, or even paler than the rest of thorax. **robusta** Strk.

I subjoin also the table for the larva given by Mr. Beutenmüller in the "Canadian Entomologist," (vol. xx, p. 135) having added two species. The larvæ of *D. modesta* and *D. robusta* are still unknown, while concerning that of *D. californica* nothing has yet been published.

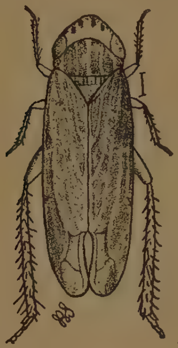
§ 1. Stripes narrower than the intervening spaces.
Body black, stripes sulphur-yellow . . . . **ministra.**
Body black, stripes citron-yellow, confluent posteriorly . . . . **drexelii.**
Body black, stripes very fine, pale yellow . . . . **angusii.**
Body black, stripes yellow, head and plates light red . . . . . . **palmii.**
Body black, stripes white, usually partly obsolete or absent . **integerrima.**
§ 2. Stripes as wide or wider than the intervening spaces.
Body black or red, stripes bright lemon-yellow . . . . **perspicua.**
Body black, stripes creamy white . . . . **contracta.**
Body black, stripes yellowish, head and anal plates red . . . . **floridana.**
Body black; stripes broken into spots, bright yellow or white; head and anal plates red . . . . **major.**

Descriptions of two JASSIDS from the Cranberry bogs of New Jersey.

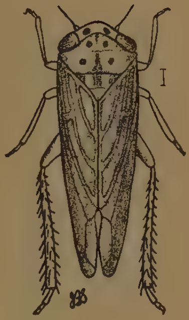
BY E. P. VAN DUZEE.



ATHYSANUS STRIATULUS
Fallen.



THAMNOTETTIX FITCHII
Van Duzee.



AGALLIA 4-PUNCTATA
Prov.

Thamnotettix fitchii n. sp.—Form of *T. melanogaster*, but smaller. Pale yellow; abdomen and four small spots on the anterior margin of the vertex black; pronotum with five pale longitudinal lines; elytra subhyaline, with yellow nervures. Length 3—4 mm.

Head finely punctured, very little wider than the pronotum. Vertex triangular, apex obtuse, disc feebly depressed; length in the ♂ subequal to the breadth on the hind margin between the eyes, in the ♀ one-quarter shorter. Front rather broad, width between the ocelli about three-fourths the length; sides nearly straight, converging from the ocelli to the apex, but much more strongly below the antennæ. Clypeus oblong, slightly contracted at base, basal suture almost obsolete, apex truncate; loræ broad, well rounded; cheeks broad, bluntly angled at about their middle. Pronotum one-fourth longer than the vertex, hind margin feebly concave, surface very minutely, transversely wrinkled. Basal ventral segment wide, its hind margin well rounded. Valve of the male broad and short, lenticular in form and occupying the concavity of the last ventral segment; plates triangular, sides convex at base, concave above, apex a little prolonged, obtuse, ciliated. Last ventral segment of the ♀ broad, hind edge strongly advanced each side in an obtuse angle, the centre with a short blunt tooth; pygofers rather long and slender, sparingly ciliated at apex.

Color pale yellow, sometimes obscure. Vertex with a slender longitudinal line and two small spots on the disc fulvous, the latter sometimes obsolete; anterior margin with a row of four black spots, the middle pair approximate; antennal cavities and a small dot just below each ocellus, black; front embrowned, with a central longitudinal and lateral transverse pale lines more or less distinct. Eyes brown; ocelli pale. Disc of the prosternum, tip of the rostrum, claws, and a dot at the base of the tibial spines, black. Pronotum with five parallel, equidistant, pale longitudinal lines. Scutellum immaculate or nearly so. Elytra dusky hyaline, nervures pale yellow, distinct. Wings whitish hyaline, nervures brown. Abdomen black; connexivum, genital pieces, last ventral segment and sometimes the disc of the two or three preceding segments, yellow in the male. The female has these yellow markings on the abdomen more extended, in some examples replacing the black entirely on the venter, and the ovipositor black; otherwise like the male.

Described from ten examples, representing both sexes, taken at Buffalo, Lancaster and Colden, N. Y., and Welland County, Ontario, from July 4th to September 10th, and one example from New Jersey (J. B. Smith). In the National Museum is an example of this species labeled *Jassus 4-punctatus* Fitch MS., but as this name is pre-occupied for an European form I have substituted for it the one here adopted.

This species somewhat resembles *Cicadula nigrifrons* Forbes, but the head is more strongly angled before, and the elytral venation and the form of the genital pieces is different. From *T. melanogaster* it may be distinguished by its smaller size and by the position of the black spots on the vertex, which are not placed on the *edge* as in that species, but on the superior surface adjoining the anterior margin.

Athysanus striatulus Fall.?—In form similar to *Cicadula exitiosa* Uhl., but with the elytra a little wider at tip. Pale testaceous, marked with black on the head, pronotum and scutellum. Elytra pale testaceous, nervures more or less broadly margined with blackish; apical areoles smoky. Length 3—4 mm.

Head wider than the pronotum, closely and finely punctured. Vertex obtusely triangular, apex rounded, its length on the median line subequal to that of the scutellum and about one-half the width on the hind margin between the eyes; passage to the front rounded, but less so than in *exitiosa.* Front wide, abruptly narrowed to the broad apex. Clypeus broad, quadrangular, not narrowed to the tip, length one and a half times the breadth, margins rectilinear; loræ large, ovate. Cheeks broad, strongly angled below the eyes, forming a broad border beyond the loræ, but not surpassing the clypeus. Pronotum finely punctured, obscurely transversely wrinkled and slightly depressed across the disc; hind edge feebly concave.

Ultimate ventral segment of the male a little longer than the preceding, with which it agrees in form; valve broad, convex, obtusely rounded at apex; plates triangular, their margin fringed with coarse white bristles, within which are three or four short, stout spines, suture depressed. Hind margin of the penultimate ventral segment of the female feebly concave, in some examples forming an indistinct, re-entrant angle, disc with a longitudinal carina; margin of the ultimate segment quite strongly arcuated each side, leaving a rounded central lobe; pygofers rather broad, apex truncate and slightly exceeded by the ovipositor, armed with irregular stout bristles.

Male: Pale, or testaceous yellow. Vertex with an impressed line and three narrow transverse bands piceous black, the posterior angled near each eye, the anterior triangularly advanced and much intensified on the median line, and terminating laterally at the ocelli; margins of the loræ, a broad stripe on the clypeus rarely attaining its base, an irregular spot below the eye, lower half of the temples, all the sutures and the front, black; the latter with the median line and about four short lateral arcs yellow. Pronotum pale testaceous, transversely inscribed with irregular piceous lines and spots omitting the anterior and lateral margins. Scutellum black, with about three irregular, longitudinal yellow lines of variable extent. Abdomen and all beneath deep black, margin of the dorsal segments and genital pieces, tips of the coxæ, knees, an annulus near the apex of the femora, the edges and spines of the tibiæ, and the tarsi of the anterior and intermediate feet and the posterior pair pale, the latter with the sides of the femora and tibiæ, the base of their spines and the apex of the tarsal joints, black. Elytra pale testaceous, nervures concolorous, heavily margined with fuscous, the apical areoles smoky. Wings sordid hyaline, highly iridescent, nervures brown. Female paler than the male, with the black markings much reduced, or almost obsolete. Elytra frequently with but faint indications of the fuscous areolar margins; apical areoles clear, at least on their centre. Pygofers fulvous; ovipositor black.

New Jersey. Described from five male and four female examples kindly furnished me by Prof. J. B. Smith.

This little insect corresponds very closely with J. Sahlberg's description of *A. striatulus* Fall. (Finl. and Skand. Cicadariæ p. 253), but differs considerably from that of Kirschbaum (Cicad. von Wiesb. p. 96). Only direct comparison with European material can decide its true relations. Should it prove distinct the name *vaccinii*, proposed by its discoverer to indicate its food habits, may be adopted.

NOTE.—These species and *Agallia 4-punctata* Prov. were found by me on Cranberry bogs, the *Athysanus* and *Agallia* in great numbers, the *Thamnotettix* sparsely. *Agallia 4-punctata* is common on herbage everywhere in south Jersey, the *Athysanus* I have never taken, except on the Cranberry bogs. In Bulletin K. of the N. J. Agl. Coll. Exper. Station I have treated of these species, and from thence are the figures at the head of this paper.—ED.

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Occasionally even economic entomology gives a useful observation to collectors. Experimenting with whale-oil soapsuds in a wheat-field recently, I turned out a little unused mixture on the ground and was surprised to note a few minutes after, that there appeared a great lot of insects over the spot. Examination showed hundreds of Staphylinidæ of two or more species making for the place and disappearing in the loose earth. Circumstances prevented my collecting any specimens, but perhaps it may serve as a hint how these insects may be attracted.

VARINA ORNATA Neum.

BY ANNIE TRUMBULL SLOSSON.

I took at Punta Gorda, Fla., a year ago, one male specimen of this pretty species described in "Papilio" vol. iv, p. 94. In March of the present year I captured several other males and three females. I think the female of this species has never been described. My specimens are uniformly larger than male, and much lighter in color. Their antennæ are simple, otherwise they do not appear to differ from the male type. Had I not killed these specimens in a cyanide bottle before discovering their sex, I should have tried to secure eggs, and learn the life-history of this interesting insect. I wonder if Mr. Neumoegen has revised his opinion of the proper position of *V. ornata* since he first described it. I do not pretend to be a competent judge as to generic differences and such grave matters, but I have a suspicion that after closer study of this moth its present place, "between *Parasa* and *Phobetron*," may be changed.

NOTES ON ELAPHIDION.

BY JOHN B. SMITH.

Some observations made by me in the Spring of 1889 on *Elaphidion* seem to add to what has been already published. In cutting about among branches for Scolytids, I found several young Oaks which had been killed by fire, how long since I could not say. Breaking one, about one and a half inches in diameter close to the ground, I found it infested by longicorn borers. I laid in a supply of sticks, representing in all cases the main stem and carried them home; splitting them open showed galleries under the bark and in the wood, a few containing pupæ, but most of them larvæ. From these issued, during the Summer, *Elaphidion villosum*, *E. parallelum* and *E. mucronatum*. I did not study the larvæ, assuming them identical, but one thing is certain: all made the same kind of burrows, and these were partly under bark, and some wholly in the wood. The burrows under bark equally contained pupæ, and all the larvæ changed to imagines in the same year. A transverse section often showed at the base of tree three and once four larval galleries, one of these evidently extending under ground. I believe the pruning habit to be by no means a universal rule, but that the beetles will oviposit wherever a suitable nidus is found, be it trunk, limb or twig.

NOTES AND NEWS.

While beating near Anglesea with Mr. Wenzel, May 28 and 29, we found the Oaks, the most abundant plant there, fairly swarming with larvæ, *Tenthredinid* and *Geometrid*. Not a leaf but had a larva, and most of them had a dozen. Many of the smaller trees were almost defoliated, and we were soon covered with caterpillars from head to foot. The umbrella and beating-net were filled with larvæ, and we were compelled to abandon the shrubbery for the open field, and even there every little seedling Oak was covered with larvæ. In the shrubbery the dropping of frass sounded like the pattering of rain, and was incessant. Skirting the wood, Mr. Wenzel noted a *Calosoma willcoxi* in pursuit of a Geometrid larva which was straining every nerve to get away. The *Calosoma* soon overhauled its victim and began eating it despite its struggles. Several of the beetles were beaten off the trees and several were taken by us running on trunks and branches. They could be easily seen and were perfectly at home in the trees; one pair was taken by me *in coitu*, the female running about on the twigs in search of prey. Only one specimen of *scrutator* was seen, while of *willcoxi* we carried off about twenty specimens and might easily have taken many more. At light, in the evening, *willcoxi* was also the common species. This was the first time I had ever seen this pretty species alive.

* * * *

In beating dead branches of Oak in Cape May County, N. J., Mr. Wenzel ran across a few specimens of *Cyrtinus pygmæus*. Further and more careful search showed that the larvæ had riddled many of the terminal twigs, and many specimens of the imago were collected on these branches. A day or two after, May 28th, I found in the same region as many as eight specimens from a single branch, six of them in the umbrella at the same time. They bear a deceptive resemblance to ants when running around in the umbrella.

* * * *

We can testify from personal experience that the mosquito, in Cape May County at least, is not yet exterminated; there was about a million of him investigating Mr. Wenzel and myself recently, and not a solitary dragonfly in sight! Ordinarily I am provided with (and use liberally on face, neck and hands) a mixture of equal parts of olive oil and oil of tar (oil of pennyroyal will do as well), and am not bothered by them; but this time a weak reliance on the effect of the recent essays induced me to go off without this mixture, and I had to take the consequences. I recommend the above mixture as very effective and conducive to comfort where mosquitos abound.

A NEW PAMPHILA.

BY HENRY SKINNER, M.D.

Pamphila slossonæ n. sp.—In size and markings this species comes nearest to *P. leonardus* Harris. The male expands rather less than an inch and a half. Ground color of inferior wings dark brown, with basal half of wing thickly covered with tawny scales which, beyond the stigma, form three spots, and just above these are two small square ones. The three subcostal spots are represented as in *leonardus*. Stigma narrow, black, and concave posteriorly. Inferior wings same color as superior, with tawny scales scattered over the basal half. There are four small, square, tawny spots close together, with a fifth elongated one at right angles with the four, on outer half of wing running nearly parallel with the outer margin, only the angle made by the spots is more acute. Fringes of all wings dingy white. The maculation on underside of superiors is nearly the same as in *leonardus*, but in color very different, the ground color in this species being made up of yellowish and greenish scales; underside of inferiors olive-green, with the spots of the upperside repeated, except there is a sixth one near the centre of the wing, and all are dingy white. Fringes on underside same as above. Head and thorax above covered with greenish hair, beneath grayish yellow. Palpi almost white.

The female expands a little more than an inch and a half. Superior wings very dark brown, with a broken band of yellow consisting of five spots commencing at the first nerve above the interior margin and extending to within one-eighth inch of apex. The subcostal spots are present, as in the male, with two additional ones at end of cell. The inferiors as in the male, but with spots fainter; underside of wings also same as in male, but the white spots on inferiors are smaller. Fringes in female dark on superiors, but gradually getting lighter on inferiors as the anal angle is approached.

Described from one pair from Florida, presented by Mrs. Slosson. I think that Hesperids can be best described by comparison with well-known species. While this resembles *leonardus* in maculation, it is very different from it, and can readily be separated by the white fringes, lighter color of markings, green underside of inferiors, greenish head and thorax and nearly white palpi, etc. I have named this species in honor of Mrs. A. T. Slosson, who has done so much excellent and interesting field work in Florida and the White Mountains of New Hampshire.

The edition of the Check-List of Macrolepidoptera published by the Brooklyn Entomological Society is exhausted. A second edition had been contemplated, but in view of the fact that almost every family is undergoing "revision," it seems unwise to publish at present. Some half a dozen copies are in the hands of the editor for sale on private account, but that will exhaust the stock, and intending purchasers had better apply at once.

A NEW SPECIES OF PLAGIOMIMICUS.

BY JOHN B. SMITH.

Plagiomimicus triplagiatus sp. nov.—General color an olivaceous grayish fuscous; head paler; collar with a white line at tip; thoracic vestiture mixed with white scales. Primaries, t. a. line white, narrow, upright, but slightly curved outwardly. T. p. line white, distinct, broadly angulated beyond cell and almost reaching the s. t. line, thence sinuate and very obliquely inward, reaching the margin about three-fifths from base. S. t. line white, scarcely definite, though distinct, very even, or but little sinuate. The orbicular is entirely occupied by a deep, blackish brown spot, which sends back an obtuse spur to the reniform, which is very narrowly pale ringed and of a slightly darker shade of ground color; between the t. a. line and this brown spot a whitish shade still further relieves the dark marking. Between the outward angulation of the t. a line and s. t. line is a triangular blackish brown costal blotch, completely filling that part of the s. t. space. Below the middle of its course the s. t. line is preceded by a blackish brown shading, gradually broadening until, at the margin it fills nearly the entire s. t. space. Secondaries whitish fuscous, paler basally. Beneath powdery, primaries with maculation of upper surface vaguely reproduced. Exp. .90 inches; 23 mm.

Hab.—Las Vegas, N. Mex.; Hot Springs, 7000 feet; August.

Several specimens collected by Mr. Meeske, are in the collections of Hulst and Neumoegen. The species is well marked and easily recognizable by the three blackish markings and the white transverse lines of the primaries. The species is related to *expallidus* rather than *pitychromus*.

Dr. Hamilton describes the issuance of *Elaphidion* from the pupa skin. It is an interesting fact that some species (*Phymatodes amœnus* among them) do not shed the pupa skin at all, but this gradually hardens and the beetle will walk about when still almost white and the members still cased. I watched this carefully in *Phymatodes*.

SOCIETY NEWS.

Brooklyn Entomological Society, June 3d.—Meeting at Brooklyn Institute. Mr. Ottomar Dietz, chairman *pro tem.*, presiding. Twenty persons present.—Report of Treasurer presented and approved. Mr. Weeks, of Curators, presented their report of the Entomological exhibition held at the Institute under the auspices of the Department on May 22d and 23d. Exhibits were made from collections of Dr. Calverly and Prof. B. Yaeger, and of the collection of Lepidoptera of J. E. Meyer, also by H. Meeske and

F. H. Chittenden, Coleoptera, etc., and by Col. Nicholas Pike of severa hundred vials of Arachnidæ, together with fifty colored plates (original drawings from nature by Mrs. Pike) illustrating the life histories of the same. Total number of specimens exhibited 30,000. Number of visitors in attendance about 1300. Mr. Pearsall, chairman of the committee to confer with the Brooklyn Institute as to a modification of the agreement between the Institute and the Society, presented a report, which, on motion, was received and the committee continued, and authorized to prepare a draft revision of the By-Laws of the Society to be presented for approval at the September meeting. On motion the appropriation of $150 made by the Council of the Institute for the support of ENT. AMER. was accepted with thanks, and the legend "Entomological Department of the Brooklyn Institute" directed to be placed on the cover of the publication after the name of the Society. Prof. Smith, of committee on joint field meeting of Philadelphia, Newark and Brooklyn Entomological Societies, reported that the committee had selected Jamesburg as the place and July 4th as the date of such meeting, and requested that all intending to join the excursion should notify the committee at least one week in advance, that proper provision might be made for lunch, etc.

Mr. Weeks opened scientific discussion by reading a paper upon the rapacity of a female specimen of *Pterostichus lucublandus* which was observed feeding upon the dead bodies of *Doryphora 10-lineata* at noon, and which, instead of seeking to escape, attempted to carry off one of the beetles, and resisted efforts made to remove its prey, making many struggles to retain possession of it.

Mr. Weeks further read a paper entitled, "Life history and enemies of local species of Papilionidæ." The local species in the vicinity of Brooklyn comprise *Papilio turnus*, var. *glaucus*, *asterias*, var. *calverleyi*, *troilus*, *cresphontes*, *philenor* and *ajax*. The paper described the season and method of ovipositing, the appearance of the egg, the food-plant, the larvæ, and the number of broods of each species, except *ajax*, in full in this locality. The principal parasite of this family was *Trogus exesorius* Brullé, which should receive the title of "*Papilio Ichneumon*," the common appellation "*Asterias ichneumon*" being misleading, because of too limited application. Other species of *ichneumon* attacked *asterias*, making the latter title still more inapplicable. Adjournment.

A. C. WEEKS,
Recording Secretary.

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ENTOMOLOGICA AMERICANA

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PREPARATORY STAGES OF DILOPHONOTA EDWARDSII Butl. and D. ELLO Linn.

BY HARRISON G. DYAR.

Mr. Henry Edwards has described some of the stages of the first of these species,* and he is the only author who has described any stage but the mature larva of the second, and, as his descriptions were made from prepared specimens and differ from mine, I have concluded to publish the following. Mr. Edwards implies six larval stages for both species, which I do not find to be the case, and he has confounded the pupæ, describing that of *ello* and *edwardsii*, and that of *edwardsii* for *ello*.

The eggs are laid singly on the underside of the leaves of the food-plant. In shape they are elliptical, slightly flattened, above and below, very minutely punctured. Color light yellowish green. Greatest diameter about 1.8 mm.

First Larval Stage.—Head whitish, eyes black. Body pale whitish, transversely creased, the caudal horn whitish at base, the rest black. Length 4 mm. It is held nearly erect. Feet concolorous with body. Length of larva 7 mm. As the stage advances the insect becomes pale green. Duration of this stage about four days.

Second Larval Stage.—Head pale green, not shiny; eyes black; mouth very slightly brownish. Body long and slender, annulated. Caudal horn greenish white, minutely spinose, 5 mm. long. Length of larva about 15 mm. Duration of this stage four days.

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* Ent. Amer. vol. iii, p. 165.

THIRD LARVAL STAGE.—Head as before, mouth and palpi yellowish, eyes black. Body yellowish green, darker below, annulated and covered with little paler dots. A faint subdorsal line is visible. The horn is minutely spinose as before, pale whitish green, 8 mm. long. Length of larva 20 mm.

FOURTH LARVAL STAGE.—Head yellowish green, palpi and mouth paler; eyes black. A pale band before the eyes containing the sub-dorsal line of the body. Width of head about 3.5 mm. Body yellowish green. with many small, round, paler spots. Subdorsal line pale, edged above with blackish anteriorly. Horn spinose, pale greenish yellow, 10 mm. long. Spiracles whitish, with a brown spot across the middle. Concealed in the fold on the anterior part of joint 4 is a black, circular, bisected spot, surrounded by a white shade to the subdorsal line, which, as the stage progresses, becomes a round black spot with a white cross in it, surrounded by creamy white and a reddish shade anteriorly. Length of larva 40 mm.

FIFTH LARVAL STAGE.—Mature larva. Head slightly withdrawn below the skin of joint 2, whitish green, obsoletely shagreened. A vertical, pale white band just before the eyes. Eyelets four, in a semicircle, partly brown. Mouth and palpi whitish. Width of head about 5 mm. The body is folded dorsally on the anterior parts of joints 3 and 5. Each joint, except 2, 12 and 13, has eight annulets. Caudal horn thick and curved, 5 mm. long, concolorous with the body, but having a slight purple shade at the base. Body light green, thickly covered over the dorsum with short longitudinal diffuse brown streaks, about one on each annulet. These streaks are less numerous on joints 2, 3 and 4, and show a tendency to segregate on these segments into dorsal and sub-dorsal lines. On joints 12 and 13 they are nearly absent. The small round spots of the preceding stage are much reduced in size or obsolete. In the fold of joint 3 is a pale white, or purplish shade, and on joint 4 concealed in the fold when the insect is at rest is a round black patch containing a bluish white linear cross, surrounded by a reddish ring and a purplish shade to the sub-dorsal lines. In some specimens there is a faint purplish sub-dorsal line extending to the caudal horn. Spiracles white, nearly covered by a central pale brown spot. Thoracic feet whitish, abdominal concolorous with the body, the three anterior pair less well developed than the rest. Venter mottled with whitish. Length of larva about 75 mm.

When not eating, the larva rests on the back of a leaf of its food-plant on one of the large ribs, which it much resembles in color. Its length and slimness also serve to conceal it, as it might be mistaken for part of the leaf rib. During the last stages, if disturbed, it raises the front part of the body, drawing down the head and exposing the vivid mark usually concealed in the fold of joint 4. At the same time it knocks its head and the anterior portion of its body violently from side to side. This demonstration, with the sudden appearance of the highly colored spot, is doubtless intended to terrify its enemies.

The duration of the first three stages is about four days each, but the last two continue twice as long or more. Pupation occurs in a slight cocoon composed of leaves or other loose material, at the surface of the ground.

Pupa.—Long and slender; very lively in its motions if disturbed, often giving itself a peculiar rapid rotary motion, the point of the cremaster and head of the pupa only touching the ground. Color very shiny red-brown, curiously marked with black, as follows: on the head above between the eyes, legs and antennæ cases each with a streak centrally, wing cases in all the interspaces between the veins somewhat interrupted basally, thorax marked obscurely with several streaks following around its edge, each abdominal segment has a transverse band posteriorly and many little transverse streaks, beside marks between the segments, all becoming more extended posteriorly, so that the last segment is nearly all black, only a brown line being left. Spiracles black; cremaster flat and broad, with two excavations below, narrowing more abruptly for its last half and ending in a thick blunt spine, all densely punctured. Body sparsely punctured, more thickly between the segments. The wing cases show obsolete creases. Length of pupa about 60 mm.; greatest diameter 12 mm. Duration of this stage about twenty days.

Food-plant, Carica papaya. Larvæ from Dade County, Fla., near Lake Worth.

Dilophonota ello Linné.

Egg.—Nearly spherical, smooth, and of a dark green color. Diameter about 1.5 mm. Laid singly on either surface of the leaf.

First Larval Stage.—Head pale yellow, the mouth paler, but the eyes and ends of jaws black. Width probably 6 mm. Body pale green, with a dark dorsal shade. Later it is seen to be annulated and dotted with small, pale whitish spots. An obscure white subdorsal band. The caudal horn is black, 2.5 mm. long. Length of larva 6 mm.

Second Larval Stage.—Head pale greenish yellow, not shiny. Mouth and palpi paler; an obscure vertical pale line. Eyes black. Width probably 1 mm. Body yellowish green, the leaves it has eaten showing as a darker shade; marked as before, but more distinctly. Caudal horn very pale yellow, blackish at the tip, reddish at the base and 3.5 mm. long. Larva 12 mm. Later the horn is reddish with small black spines; a very faint purplish shade on joint 4 concealed by the fold. Feet reddish.

THIRD LARVAL STAGE.—Head yellowish green, the jaws and bases of the palpi paler. The lower joint of the palpus is red, the eyes black. A faint paler band continues the subdorsal line of the body. Width of head 1.8 mm. Body whitish green, with many round, small, whitish spots separated in the subdorsal space by interrupted, wavy, black lines. A whitish subdorsal line, edged above with black, converges at both ends, ending at the horn and being faint on joint 2. On the anterior part of joint 4 is a black spot with a white line in the center, surrounded by a whitish diffuse circle and supplemented by two dark red spots one at each side. Horn yellow, reddish at the base with small black spines. Spiracles yellow, with a red spot centrally. Thoracic feet reddish orange; abdominal tinged with the same color. Length of horn 4.5 mm.; of larva 20 mm.

FOURTH LARVAL STAGE.—Head flattened in front and at the sides, partly withdrawn under the skin of joint 2. Color pale green, minutely roughened. A broad, pale whitish band before the eyes, continues the subdorsal line of the body. Eyes black, mouth pale, the tips of the jaws black; palpi reddish. A few minute hairs over the surface. Width 3 mm. Body whitish green, with many yellowish round spots separated by longitudinal, wavy, interrupted black lines, which are fainter on the sides and absent on the venter. A pale yellow subdorsal band, narrowly edged above with black, except on joint 2, ends at the horn. There is a trace of a dorsal line on joint 3. Caudal horn pale yellow, reddish at the base, minutely spinose, the spines brown. Length 6 mm. Cervical shield and anal plates pale green, with small, white, elevated spots. In the fold on the anterior part of joint 3 is a white and a purplish shade, and the mark partly concealed in the fold on anterior part of joint 4 consists of a round black spot with a central line surrounded by a broad yellowish white ring and beyond this a reddish pink shade to the subdorsal line, which is here, and at the mark on joint 3, nearly white and crossed faintly by the purplish shade. Spiracles white, crossed by a central black band. Thoracic feet pinkish, thrice annulate with black. The abdominal feet, of which the three anterior pair are less well developed than the rest, are pale reddish with a black band and claspers whitish. Later they become nearly as in the last stage (except the pair on joint 13, which are plain), but the lower white band and the olive gray band are replaced by reddish, divided by a brown line. Length of larva about 40 mm.

FIFTH LARVAL STAGE.—The mature larva varies from dark green of the color of the leaf of its food-plant to brown. The green form has the markings of the brown form more or less obsolescent. The subdorsal line is usually distinct, the marks in the folds pale, affecting the sub-dorsal line much as in the previous stage. The brown form is as follows: Head flattened at the sides, white, the sutures marked with black and the following black marks; a short line in the center of the triangular plate basally; two shades on either side of the central suture, converging slightly vertically; a line up from the base of the palpus, dilated centrally and blended inwardly; a short line covering the eyes and a line on the posterior portion of the side of the head. Palpi tipped with reddish. Head minutely and sparsely pilose; width, 5 mm. The caudal horn is a conical rounded tubercle, from an elevated base, white. Body purplish gray, with many round, small, diffuse yellowish spots, and longitudinal, short, wavy black lines between them, more pronounced above the sub-dorsal line and forming its border. This converges on joint 3 and forms a continuation of the lines of the head. This line also converges on joint 12 and ends at the horn. A series of black shaded dorsal spots on joints 5–11 anteriorly. Laterally, and especially in patches between the segments superstigmatally, the yellowish spots are paler and enlarged, some partly confluent, giving the body a paler appearance, while the black lines are fewer and more diffuse. The dorsum of joint 2 imitates the markings of the head, having a dorsal line and the sub-dorsal space filled in with a dull olive shading. Below this it has a broad white band; joint 3 is suffused over the dorsum with a nearly uniform purplish flush, but the markings reappear on the posterior part, widened and more diffuse and end on the fold on the anterior part of joint 4, which has nearly concealed a round black spot, bisected by a narrow blue line surrounded by a white ring, and this nearly enclosed by an olive-brown shade, replaced by pinkish to the sub-dorsal line. Venter pale, the black marks nearly lost. Thoracic feet white, with three black rings; the abdominal (of which the last two pair are best developed) on joints 7–10 are as follows: Base white, next a broad velvety black stripe, then a powdery blue stripe, a yellowish one edged by a narrow blackish line and followed by a white band, a black line, a broad olive-gray band and the claspers white. Anal feet unornamented, the plates yellowish gray, with rather few elevated white spots. Spiracles white, bisected by a gray band. Length of larva 80–100 mm.

Cocoon.—Formed of threads and loose material at the surface of the ground.

Pupa.—Of similar shape to that of *Dilophonota edwardsii*, but much more robust and less lively. It is marked after the same pattern in black and red-brown, but the black is very extensive, covering nearly the whole pupa. Color black, very shiny, marked obscurely with red-brown on the veins of the wing cases and on the leg cases; a curved line at the back part of the thorax, and a more distinct, wavy, narrow band around each of the anterior abdominal segments. Body punctured between the segments; wing cases and thorax creased. Cremaster flat, somewhat rounding above and below, broad at the base and tapering evenly to the front; densely punctured. Length of pupa 55 mm.; width, 13 mm. Duration of the larval stages from three to seven days; of the pupa twenty-eight days.

Food-plant, Euphorbia cyathophora. Larvæ from Dade Co., Florida.

CONTRIBUTIONS TOWARD A MONOGRAPH OF THE NOCTUIDÆ OF TEMPERATE NORTH AMERICA.

Revision of Scopelosoma Curtis.

BY JOHN B. SMITH.

Genus **SCOPELOSOMA** Curtis.

1838 Curtis, British Insects xiv, 635.

Eyes naked, strongly lashed; the lengthy strong hair almost meeting over the eye. Head strongly retracted, the front clothed with short, loose, somewhat divergent vestiture; palpi very short, scarcely reaching the front. The antennæ are simple, or with a single lateral bristle in the ♀; simple, with lateral tufts of fine short hair in the ♂. Thorax quadrate, somewhat depressed; vestiture hairy, in some species with elongate scales intermixed; rather long and decumbent, smooth. The collar is slightly prominent in front, and there is an elevated anterior crest, very distinct in good specimens. The abdomen is depressed, in the ♂ more or less flattened, little or not exceeding anal angle of secondaries. The legs are unarmed, and the underside is rather thickly clothed with woolly hair.

The primaries are short, subequal, with rectangular apices, outer margin straight to middle, then obliquely inward, angle not retracted.

The genitalia of the ♂, so far as known, are referable to three types, or rather there are two types, and two of the species which are otherwise very close to others are aberrant in this respect.

The species are readily divisible into two series—the first with broader primaries, bright colors—yellow forming a prominent feature, distinct, oblique or slightly sinuate median shade line, and well defined ordinary spots; the second with distinctly narrower primaries, dull colors of which luteous usually forms a base, median shade line usually distinct, but angulated above middle. Ordinary spots not defined, orbicular in all except *3-stigmata* obsolete. The first series contains *græfiana*, *moffatiana*, *pettiti* and *ceromatica*. Except *moffatiana*, these species have practically similar genitalia. The harpes are broad, the upper margin thicker, chitinous, curved and produced into a blunt, rounded tip, from the lower edge of which projects a small acute spur. The clasper is a rather long, stout, corneous hook, extending nearly to the end of the projecting harpe, and but moderately curved. The slight differences in detail between the species are better noted by a comparison of figures than by any description.

I head the species with *græfiana*, which is pale ocher-yellow, with rigid, single, median lines and an almost equally rigid median shade line.

Moffatiana is closely allied in color and maculation; so closely indeed, that for a long time they were considered identical. The superficial differences narrow to a deeper, more reddish ground color, and less rigid transverse lines. The t. a. line especially, is in this species usually bent on the subcostal vein. The ♂ genitalia are of an entirely different type from the other species of the group. The harpes are narrow, elongate, the upper margin straight, the inferior margin obliquely curved, meeting the upper margin in an acute point at tip. From the middle of upper margin extends a corneous rib, obliquely downward and projecting as a spur considerably beyond the margin of harpe. The clasper arises rather near the base of the harpe, is stout, strong, obtuse and somewhat enlarged at tip and forms an irregular half circle. This strong difference in species otherwise so nearly allied is remarkable.

Pettiti is a small species, the smallest of the genus in fact, the ground color like *moffatiana*, but all the maculation indistinct. From both the preceding it differs by the crenulate t. p. line.

Ceromatica agrees with *pettiti* in the crenulate t. p. line, but it is much larger, and the color is an intense orange-red, with violet powderings.

The second series contains the remainder of the species, and these again with the exception of *vinulenta* agree in genital structure. The harpes are rather elongate, of moderate width, equal to near tip, then suddenly narrowed and bent, the tip again somewhat broader, obliquely truncate or rounded, inwardly fringed with very fine spinules. The clasper extends along upper margin of harpes to the bend, is there very abruptly curved and extends straight downward, considerably beyond the tip of harpes.

Tristigmata, *walkerii* and *sidus* have the t. p. line dark and crenulate; *morrisoni* and *devia* have it pale and even.

Tristigmata has the orbicular distinct, and the claviform evident, differing by the first of these characters from the others in this series by the second from all the others of the genus. The color is a reddish luteous.

Walkerii lacks the orbicular, has the reniform usually marked with white, and is reddish luteous, powdery.

Sidus, of which *vinulenta* is undoubtedly a synonym, differs superficially only in the dull, somewhat rusty red-brown color. The maculation is identical, but usually more strongly marked. The genitalia are very different, and somewhat like *moffatiana;* the harpes are moderately wide, lower margin excavate near tip, which narrows to an obtuse point. The clasper is like that of *moffatiana*.

Morrisoni is again luteous reddish, like *walkerii*, but differs as already indicated by the even, pale t. p. line.

Devia is more mouse-gray in color, with white powderings. The distinctive feature of the species is a broad, oblique shade through s. t. space, and the approximate median lines.

In synoptic form the species are distinguishable as follows:

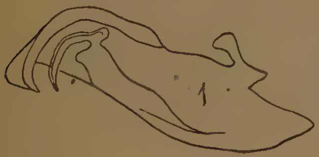
Wider winged species; ocher yellow to dark brick red, the median shade prominent; ordinary spots large, defined.
  T. p. line very distinct, even, not crenulate or marked on veins.
    Paler ocher yellow; t. a. line upright . . . . **græfiana.**
    Darker yellow; t. a. line obtusely angulate on subcostal vein. **moffatiana.**
  T. p. line less contrasting, crenulate, marked on veins by darker points.
    Reddish ocher yellow; size smaller . . . . **pettiti.**
    Dark orange-red, with violet powderings; larger . . . . **ceromatica.**
Narrower winged species; luteous to red-brown; median shade less distinct; ordinary spots smaller, indefinite or obsolete.
  T. p. line crenulate; dark.
    Orbicular distinctly, claviform faintly indicated . . . . . **tristigmata.**
    Orbicular and claviform wanting.

Luteous to fuscous or reddish powdery . . . . **walkerii.**
Red-brown . . . . **sidus.**
T. p. line even, pale.
Variable in color; luteous to brown; t. p. line irregularly sinuate; s. t. line irregular, angulate . . . . **morrisoni.**
Sordid luteous gray; t. p. line evenly bisinuate; a distinct, rigidly oblique pale shade line through s. t. space . . . . **devia.**

S. græfiana.

1874, Grt. Buff. Bull. ii, 69, *Scopelosoma.*
1882, Grt. ‡ Ill. Essay 65, pl. 3, fig. 438, *Scopelosoma.*

Rather pale yellow, with orange irroration; transverse lines distinct, brown. Basal line distinct. T. a. line rigidly upright, or slightly oblique. T. p. line inwardly oblique; with a small outward curve on costa, thence rigid to hind margin. A distinct, slightly arcuate median shade line equally distinct from costa to inner margin; forming inner boundary of reniform. S. t. line very faint, barely traceable, irregular, punctiform. A row of terminal lunules. Ordinary spots concolorous, ringed with brown. Orbicular small, round; reniform large, slightly constricted medially. Secondaries pale yellow, with an outer darker line. Beneath pale yellow, with a more or less complete outer line; secondaries with discal lunule. Head and thorax concolorous with primaries. Antennæ of ♂ with fine lateral tuftings, of ♀ perfectly simple. Expands 1.30—1.50 inch.; 33—38 mm.



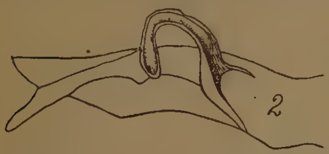
Hab.—New York northward.

The differences between this species and the closely allied *moffatiana* are elsewhere discussed.

S. moffatiana Grt.

1882, Grt., Bull. U. S. Geol. Surv. vi, 583, *Scopelosoma.*
græfiana ‡ Grt.
1882, Grt., Ill. Essay 65, pl. 3, fig. 38, *Scopelosoma.*
1882, Grt., Bull, U. S. Geol. Surv. vi, 583, pr, syn.

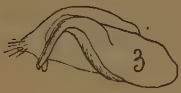
Rather deep reddish yellow, the lines distinct, darker brown. T. a. line somewhat arcuate, rarely nearly rigid. T. p. line with an initial curve on costa, thence inwardly oblique and usually somewhat arcuate to hind margin. S. t. line faint, irregular. A row of terminal lunules; median shade line rather broad, diffuse, subsinuate. Ordinary spots concolorous with brown outlines; orbicular rather small, round; reniform large, somewhat constricted at middle. Secondaries pale yellow, with a reddish suffusion, the outer line of underside sometimes faintly reproduced. Beneath as in *græfiana*. Head and thorax concolorous with primaries. Expands 1.40—1.50 inch.; 35—37 mm.



Hab.—New York, northward.

S. pettiti Grt.

1875, Grt., Can. Ent. vii, 188, *Scopelosoma.*
1877, Grt., Can. Ent. ix, 213, *Scopelosoma.*



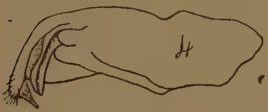
Deep reddish yellow, all the maculation indistinct. Basal line often obsolete. T. a. line upright, often obsolete. T. p. line oblique, arcuate, marked on veins with black points, which makes it seem crenulated. S. t. line indistinct, also marked with faint blackish shades on the veins. A row of indistinct terminal lunules; median shade rather diffuse, always distinct; slightly or not at all sinuate. Ordinary spots concolorous, faintly outlined; orbicular small, round, often scarcely discernible; reniform large, more obvious, with a blackish spot inferiorly. Secondaries pale yellow, with a faint reddish suffusion. Beneath as in *græfiana* and *moffatiana.* Expands 1.10 inch.; 27 mm.

Hab.—Canada, Iowa, New York.

This species is readily distinguished from all the broad winged forms by the obsolete maculation and small size. From *ceromatica*, its nearest ally, it is distinguished by the much more yellowish-red color.

S. ceromatica Grt.

1874, Grt., Buff. Bull. ii, 70, *Scopelosoma.*
1874, Grt., Buff. Bull. ii, 125, *Xanthia.*



Rather dark orange-red, with violet powderings; terminal spots somewhat darker; median lines brown. T. a. line upright, or but feebly arcuate, even. T. p. line parallel with, and rather close to outer margin, crenulate; the points blackish. S. t. line irregular, inwardly diffuse, slightly paler; outwardly limited by the darker terminal space. Basal line barely traceable. A distinct, slightly sinuate median shade line, touching outer boundary of reniform. Orbicular small, round, concolorous, with darker outline and a pale inner annulus. Reniform large, kidney shaped, darker, with pale ring; inferiorly there is a blackish dot. Secondaries luteous, with an orange suffusion. Head and thorax concolorous with primaries. Beneath pale yellowish orange, with a red-brown outer line; secondaries with discal lunule. Antennæ of ♂ thicker and ciliate; of ♀ more slender and simple. Expands 1.20—1.40 inch.; 30—35 mm.

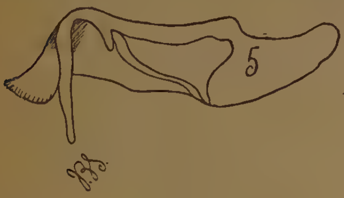
Hab.—New Jersey, New York, Maine, New Hampshire, Canada.

A very distinct form, recognizable by the deep orange color and violet powderings; it is the most intensely colored of the wide winged species.

S. tristigmata Grt.

1877, Grt., Can. Ent. ix, 156, *Scopelosoma.*
1884, Thaxter, Can. Ent. xvi, 33 (life history).

Reddish luteous, with black powdering, transverse lines and ordinary spots distinct; terminal space darker, more heavily powdered. Basal line distinct, black. T. a. line upright, somewhat irregular, varying in shade from brown to black. T. p. line black, parallel with outer margin, with black points on veins making it crenate. A more or less broken brown shade in s. t. space serves to indicate the concolorous s. t. line. Through the median space is a dark brown shade, outwardly angulate, the angle touching the black filling of inferior portion of reniform; the latter is large, not defined, usually of a paler shade of ground color, but often white; always, however, the inferior portion is black filled. The orbicular is small, round, concolorous, neatly brown ringed. The claviform is small, pointed, inconspicuous, but evident in all specimens I have seen. Head and thorax concolorous with primaries. Secondaries blackish with reddish fringes. Beneath reddish powdery, with a variably distinct outer line and discal lunule. Expands 1.20—1.40 inch.; 30—35 mm.



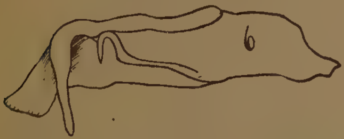
Hab.—Dist. Columbia, New York, Massachusetts, New Hampshire, Maine, Canada.

A very distinct species, evidently belonging to the narrow winged series, and yet with considerable likeness in maculation and habitus to the wider winged forms. The black spot in inferior portion of reniform, the evident claviform, the darker terminal space and crenulated t. p. line are distinctive.

S. walkerii Grt.

1864, Grt., Proc. Ent. Soc. Phil. ii, 439, pl. 9, fig. 5, *Dichagramma.*
1873, Grt., Buff. Bull. i, 192, *Scopelosoma.*
1874, Grt., Buff. Bull. ii, 71, ? an var. *sidus.*
1875, Grt., List Noctuidæ, an sp. dist.
1882, Grt., New List, an var. *sidus.*
1884, Thaxter, Can. Ent. xvi, 31, an sp. dist. *vinulenta* (life history).

Reddish luteous, powdery, maculation often indistinct, subobsolete. Basal line rarely traceable. T. a. line often indistinct, or even entirely wanting; when present, rigidly upright, pale or dusky, preceded by a narrow pale shade. T. p. line well removed toward, and parallel with the outer margin; crenulate, dusky or blackish; often indistinct. S. t. line very faint, concolorous, barely traceable, sometimes more relieved by blackish powderings at either side; median shade variably distinct, angulate; the angle touching the reniform inferiorly. Orbicular wanting; reniform a narrow, blackish lunule, usually with a larger ovate white spot in the middle and small white dots at the tips. Secondaries smoky to blackish, with pale fringes, variably shaded with reddish. Beneath with a dusky common line, variably complete; and a discal lunule. Antennæ



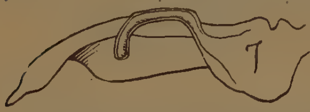
laterally bristled in both sexes, much more distinctly, however, in the ♂. Head and thorax concolorous with primaries. Expands 1.25—1.45 inch.; 31—36 mm.

Hab.—Texas, Iowa, New York, Canada, Maine.

In this species the tendency is to an obsolescence of all markings, and not infrequently the large white spot in the reniform will be the only distinct feature of the wing. Mr. Thaxter, in describing the larva of this species, concluded it distinct from *sidus* (*vinulenta*), a conclusion which is strikingly borne out by the structural characters.

S. sidus Gn.

1852, Gn., Sp. Gen. Noct. i, 386, *Scopelosoma.*
1856, Wlk., C. B. M. Mus. x, 454, *Eupsilia.*
1873, Grt., Buff. Bull. i, 191, *Scopelosoma.*
1874, Grt., Buff. Bull. ii, 71, *Scopelosoma.*
vinulenta Grt.
1864, Grt., Proc. Ent. Soc. Phil. ii, 440, pl. 9, fig. 6, *Dichagramma.*
1873, Grt., Buff. Bull. i, 191, pr. syn.
1874, Grt., Buff. Bull. ii, 70, an sp. dist.
1882, Grt., New List, an var. *sidus.*
1884, Thaxter, Can. Ent. xvi, 32 (life history).



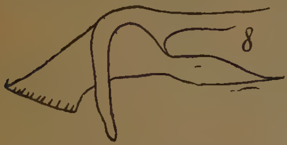
Vinous red-brown, more or less powdery, terminal space darker, all the lines distinct. Basal line distinct, obsoletely geminate, included space paler, of a violet tint. T. a. line rigidly oblique, darker brown, with a preceding violet shade. T. p. line blackish brown, parallel with outer margin, somewhat dentate or crenate on veins. S. t. line broad, concolorous, or but slightly paler, marked by the dusky terminal space, and a preceding darker brown shade. The median shade is blackish, diffuse, angulate as in *walkerii*. Reniform also as in *walkerii*, orbicular wanting. Secondaries blackish, with paler reddish fringes. Head and thorax concolorous. Beneath rusty, powdery, disc of primaries blackish; a common outer dark line and dark discal lunule. Antennæ ciliate, most evidently so in the ♂. Expands 1.20—1.40 inch.; 30—35 mm.

Hab.—Texas, New York to Canada.

The only one of the narrow winged species that is vinous brown in color, and therefore readily distinguished. The affinities of the species are elsewhere discussed. It is variable in color, and the white of reniform is a variable quantity. Sometimes this species and *walkerii* will be so nearly alike in color that it will require close examination to properly refer a specimen. Both in genital structure, however, and in larval history they are distinct.

S. morrisoni Grt., Buff. Bull. 2, 70.

1874, Grt., Buff. Bull. ii, 70, *Scopelosoma.*
1884, Thaxter, Can. Ent. xvi, 30, life history.



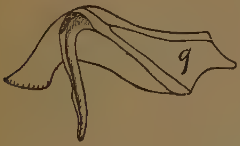
Luteous to ferruginous, finely powdered; median lines narrow, pale, even. Basal line pale, often indefinite or wanting. T. a. line rigidly upright, or slightly oblique, rarely faintly sinuate. T. p. line variable; rarely rigidly upright, often arcuate or sinuate, usually about parallel with outer margin. S. t. line faint, hardly paler, irregularly dentate; sometimes preceded by a slightly darker shade. Orbicular obsolete; reniform sometimes obsolete, more usually marked as a narrow, slightly paler, rarely white lunule, inferiorly with a blackish dot. The median shade line is indistinct, or entirely wanting. Secondaries blackish, with pale, more or less reddish fringes. Head and thorax concolorous with primaries. Antennæ ♂ ♀ with lateral bristles to each joint. Expands 1.40—1.48 inch.; 35—37 mm.

Hab.—New York, Massachusetts, northward to Canada.

Distinguishable by the even, narrow, pale median lines and indistinct irregularly angulate s. t. line.

S. devia Grt.

1874, Grt., Proc. Ac. Nat. Sci., Phil. 1874, 209, *Scopelosoma.*
1884, Thaxter, Can. Ent. xvi, 33, life history.



Mouse-gray, with pale powderings, less distinct in median space; median lines whitish. T. a. line remote from base, inwardly oblique, even, rigid. T. p. line rather narrower, even, bisinuate. S. t. line distinct, pale, irregularly sinuate; through the middle of the s. t. space is a rigidly oblique, rather broad, pale shade line. Orbicular wanting, reniform narrowly and incompletely outlined. The basal line is usually traceable, but often absorbed in the pale powderings of the basal space. The median lines are unusually approximate. Secondaries a shade paler than primaries, but not powdery. Beneath like secondaries above; powdery; a broad, diffuse, outer line on both wings. Head and thorax concolorous with primaries; abdomen with secondaries. The ♀ antennæ are laterally bristled, in front clothed with pure white scales for half their length. Exp. 1.20—1.32 inch.; 30—33 mm.

Hab.—New York and northward.

This species is very readily distinguished by the absence of median shade line, and the presence of a broad pale shade through s. t. space. It is rather rare.

The first meeting of the Entomological Club of the A. A. A. S. will be held at the room of the Biological Section, at the State House, Indianapolis, Ind., at 9 A. M., Wednesday, August 20th. Members expecting to attend will please notify the President, Prof. A. J. Cook, Agricultural College, Michigan, or the Secretary; and all expecting to present papers are urgently requested to forward titles to F. M. Webster, Sec'y, Lafayette, Ind.

Remarks on the Habits of some species of Cleridæ.

BY FRANK H. CHITTENDEN.

Elasmocerus terminatus Say.—Last year at Staten Island, May 17th, I discovered in an infested grape vine a larva of *Phymatodes amœnus*, to which was attached another larva engaged in devouring it by absorbing its juices. The predaceous larva had begun operations at the caudal extremity of the Cerambycid, about one-quarter of which was shriveled up. The remainder was intact, and the insect was still alive when placed in alcohol two days later. A pupa found at the same time was almost entirely white, greatly resembling a hymenopterous pupa. On the 18th it had begun to color, the elytra assuming a darker hue, and on the following day the species was recognizable.

Trichodes apivorus Germ.—I have found on the flowers of Solidago and the New Jersey tea plant (Ceanothus americanus) during July and August. Ithaca, N. Y.

Clerus rosmarus Say.—A specimen was observed last year seated on the leaf of a shrub devouring a small Nitidulid, *Cercus abdominalis*. Orange, N. J., June 9th.

Thanasimus dubius Fab. is probably restricted, at least in its adolescent stages, to the Coniferæ. It appears early in the Spring and preys upon pine-boring Scolytidæ.

Clerus thoracicus Oliv. is quite common in this vicinity, occurring on a variety of deciduous trees during May and June. I have bred specimens from the following: Pear tree February 11th and March 2d; Butternut, March 18th; Chestnut, May 1st to 14th; Willow, April 8th. This species is undoubtedly predaceous, and I suspect lives at the expense of various Cerambycid larvæ. One specimen reared from a Chestnut twig, attacked and made a meal off the abdomen of an *Anthaxia*, which had bred from the same wood.

Unfortunately, I have not preserved good specimens of the larvæ. Full grown specimens are about a quarter of an inch in length, of a nearly uniform purplish hue, hairy, and the thorax is ornamented by two dark spots. The last segment terminates in two corneous appendages of a dark brown color.

When full grown the larva forms a burrow, often in the disused gallery of some Longicorn, or other wood borer, lining it with a silvery silken substance. One of these burrows in my possession measures 80 mm. in length and 2–3 mm. in diameter.

The pupa, like others of the family that have come under my notice, does not exhibit the characteristic structural features of the adult insect. One larva taken March 10th had assumed the pupal stage on the 23d, and became a perfect insect April 8th.

Thaneroclerus sanguineus Say, has similar habits to the foregoing. One specimen was found dormant in a burrow which it had constructed in the dead wood of an Oak, March 27th; another was taken from dead Maple wood, May 9th, both at Ithaca, N. Y. Two examples were found by Mr. G. W. J. Angell at Rangeley Lakes, Maine, May 20th, on a pile of cut Birch, one of them taken from the wood.

Hydnocera unifasciata Say.—Taken on Chestnut and Tulip trees July 6th to 20th.

H. humeralis Say.—Occurs in numbers on the common Bay berry (Myrica cerifera) at the beaches in the vicinity of New York City—Highland Beach, N. J., Rockaway Beach, L. I., June 18th to July 3d.

H. pallipennis Say.—Occurs with *H. unifasciata*, July 24th to September 8th.

H. verticalis Say.—Bred from Hickory twigs June 15th to 29th. Occurs on Hickory leaves July 9th to 26th.

H. longicollis Ziegl.—Bred from a larva found under the bark of Witch-hazel (Hamamelis virginica). It was taken from the blind end of a burrow that had been made by some beetle—presumably a Cerambycid—of the size of *Phymatodes variabilis*, and was hemmed in by a layer of castings about half an inch long. The burrow was lined with a silvery substance somewhat like that observed in the burrows of *Clerus thoracicus*. The larva when found, April 26th, was about to pupate; it transformed in confinement May 22d. I have also bred this species from Hickory twigs, and have found the beetles on the leaves of Hickory in July.

Phyllobænus dislocatus Say.—Bred from Butternut twigs May 4th. Occurs in this vicinity in June.

Chariessa pilosa Forst.—Bred from a larva found in a Hickory twig at South Woodstock, Conn., on October 30th. Imago developed in May. Also taken at Ithaca, June 14th *in copula* on the trunk of a Butternut tree.

Laricobius erichsoni Rosen.—Abundant in early Spring on the foliage of White Pines.

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 110, vol. vi.)

GAUROTES LeConte.

This genus was separated by Dr. LeConte for our common Eastern species *cyanipennis*, and now contains three species readily recognized by the shining green elytra, which are sparsely and weakly punctured in the typical species, more strongly in *abdominalis*, and quite closely and deeply in *cressoni*. The character used to mark the genus in the "Classification," and which we have followed above, is, strictly speaking, confined to *cyanipennis*, i. e. the protuberant mesosternum. Mr. Frederick Blanchard first called attention (Bull. Br. Ent. Soc. vii, p. 108) to the fact that the mesosternum is not at all protruberant in *abdominalis*, and only feebly so in *cressoni*, and the three species might indeed form the types of three genera. We do not find any better character, and the color, fortunately, renders them easy to distinguish and serves to separate them one from another.

Synopsis.

Abdomen black, legs and antennæ pale . . . . . , ...	**cyanipennis.**
Abdomen pale, legs and antennæ pale, except basal joint . .	**abdominalis.**
Abdomen pale, legs bicolored, antennæ piceous; larger species .	**cressoni.**

G. cyanipennis Say, J. A. P. iii, 1823, p. 423; *ione* Newn., Ent. 1842, p. 30; *leonardi* Hald., Trans. Am. Phil. x, 1847, p. 60; *chalybea* Hald. l. c.; Lec., J. A. P. ser. 2, i, p. 331; *servillei* Serv., Ann. Fr. 1835, p. 214.

Length 9—10 mm. = .36—.40 inch. *Habitat.*—Can., N. H., Mass., N. Y., N. J., Pa., Va., Carolina, Ky., Mich., Ark.

G. abdominalis Bland, Proc. Ent. Soc. i, 1862, p. 270.

Length 10 mm. = .40 inch. *Hab.*—N. H., Va., Pa.

G. cressoni Bland, l. c. 1864, p. 69.

Length 11 mm. = .44 inch. *Hab.*—Rocky Mts., Col., Nev.

BELLAMIRA LeConte.

B. scalaris Say, J. A. P., v, 2. 1827, p. 278; Hald., Trans. Am. Phil. x, 1847, p. 65; *coarctatus* Hald., l. c. p. 59; Dej., Cat. 3, ed. p. 380.

Length 19—27 mm. = .76—1.08 inch. *Hab.*—Can., N. H., N. Y., Pa., Mich., N. J., Md., S. W. Va., La.

A large handsome insect, chestnut-brown in color with a long attenuated abdomen, which gives it a wasp-like aspect. The form is very slender, and the elytra strongly sinuate as in the next genus. The last ventral segment in the male is very strongly excavated.

STRANGALIA Serville.

The form is elongate in all the species of *Strangalia*, very markedly in all but *sexnotata*, and the last ventral segment of the male is excavated, strongly in all but the last two. The poriferous system of the antennæ is lacking in *delicata*, but is present in the others, and is contained in small, oval, depressed spaces, situated near the tip of the sixth and following joints. The following synopsis is copied from Dr. LeConte's of 1873, with *delicata* the only new species since found, interpolated. It will be noted that the generic characters become weaker in the last species. There is far less variation in color in this genus than in *Acmæops*.

Synopsis.

A.—Body very elongate; fifth ventral ♂ very deeply excavated, so as to appear emarginate, lateral lobes thin, expanded; elytra not fasciate.

Hind tarsi with third joint scarcely emarginate.

Ferruginous, antennæ thicker; elytra more coarsely punctured with pale sutural markings; fourth ventral ♂ with a broad apical impression . . . . **virilis.**

Hind tarsi with third joint strongly emarginate.

Above testaceous, head sometimes fuscous; antennæ blackish, slender; prothorax with two broad black vittæ; elytra less coarsely punctured, with black marginal spots; beneath usually dark, abdomen sometimes, and legs partly, testaceous . . . . **famelica.**

Black, elytra more coarsely punctured, pale, with margin and suture blackish; tip less acuminate and more distinctly truncate than in the preceding, than which it is much smaller and more slender. **acuminata.**

B.—Body very elongate; fifth ventral ♂ more or less excavated, but not emarginate, lateral lobes not or merely moderately expanded; third joint of hind tarsi emarginate.

Ferruginous, elytra with two transverse testaceous bands each margined with black . . . . **strigosa.**

Rufo-testaceous; prothorax with two vittæ, elytra with three transverse bands black; hind thighs black at tip; antennæ yellowish. **luteicornis.**

Ferruginous, elytra black . . . . **bicolor.**

Black, abdomen and legs ferruginous, elytra testaceous, more or less vittate with black . . . . **delicata.**

C.—Body less elongate, fifth ventral ♂ only triangularly impressed; sixth joint of antennæ without sensitive spot.

Ferruginous, elytra paler, with three large spots extending from the margin nearly to the suture . . . . **6-notata.**

S. virilis Lec.. S. M. C. No. 264, 1873, p. 212.
Length 15—19 mm. = .60—.76 inch. *Hab.*—Texas.

S. famelica Newn., Ent. 1841, p. 68; Hald., Trans. Am. Phil. x, p. 61; *angustata*, Dej., Cat. 3, p. 381; *nigricornis*. Knoch, i. litt; *confluenta*, Hald., l. c.; *solitaria*, Hald., l. c.
Length 13—14 mm. = .52—.56 inch. *Hab.*—Mich., Ia., Ky., Pa., N. Y., N. C., Va.. Ga., Ala., Md., Mo., Ohio.

Varies entirely black, also entirely pale, with the antennæ and parts of the legs dark. Specimens of *luteicornis* sometimes are called by this name when the elytral bands are incomplete, but the two species may be separated by the color of the antennæ instantly, which is black or nearly so in *famelica* and always pale in *luteicornis*.

S. acuminata Oliv., 1795, Ent. iv, 73, p. 20, t. 3, fig. 35; Lec., J. A. P. ser. 2, 1, 1850, p. 330; *emaciata* Newn., Ent. p. 68; *necydaloides*, Knoch, i. litt.
Length 8—9 mm. = .32—.36 inch. *Hab.*—Ct., N. Y.. N. J., Pa.

Varies entirely black.

S. strigosa Newn., 1841, l. c. p. 69; Hald., Proc. Ac. Phil. iv, p. 175.
Length 16 mm. = .64 inch. *Hab.*—Florida.

S. luteicornis Fab., Syst. Ent. 1775, p. 197; Oliv., Ent. iv, 73, p. 20, t. 3, fig, 34; Hald., Trans. Am. Phil. x, p. 61.
Length 9—13 mm. = .36—.52 inch. *Hab.*—N. Y., Pa., Va., N. C., Ga., Fla., Ky., Mass., La., Can., Md., Ohio.

S. bicolor Sweder. Vet. Ac. Nya. Handl. viii, 1787, p. 197; Say, J. A. P. iii. p. 418.
Length 12—14 mm. = .48—.56 inch. *Hab.*—Mich., Ky., Ohio, Pa., Ga., Va., N. Y., Ala., Can. W.

S. delicata Lec., 1874, Trans. Am. Ent. Soc. v, p. 97.
Length 12 mm. = .48 inch. *Hab.*—Cal., Nev.

S. sexnotata Hald., 1847, l. c.
Length 8—13 mm. = .32—.52 inch. *Hab.*—Ga., Fla., Tex., N. Mex., Mass.

TYPOCERUS LeConte.

This genus contains a number of species exactly like *Leptura* in general form and in coloring, but differing by the large, impressed, poriferous spaces on the antennæ. The following synopsis follows that of Dr. LeConte (S. M. C. No. 264, p. 213), and includes the species since described.

Synopsis.

A.—Antennæ black, with sixth and following joints with impressed poriferous spaces; prothorax not strongly rounded on the sides.
  Prothorax very coarsely punctured.
    Prothorax margined before and behind with golden hair, legs ferruginous.
      Elytra acutely acuminate, with indistinct yellow bands; prothorax narrowed from the base, sides subsinuate . . . . **badius.**

Elytra less acutely acuminate, black with three bands and two basal spots yellow . . . . **zebratus.**

Prothorax margined with hair at base, legs and antennæ black.

Elytra black, with a broad angulated yellow spot, sometimes divided, extending from the base to the side margin, enclosing the humeral angle and posterior yellow band, often missing . **lunatus.**

Elytra black, with basal spot and three transverse bands yellow, the two anterior bands sometimes united at suture . . . . **sparsus.**

Prothorax more densely, less coarsely punctured; pubescence golden, denser at base and tip.

Legs ferruginous; elytra brown, with four yellow bands, frequently imperfect or obsolete, tip sub-obliquely truncate and feebly bispinose . . . . **velutinus.**

Legs black; elytra black, tip obliquely truncate and shortly acuminate. **lugubris.**

B.—Antennæ brown; prothorax strongly punctured, much rounded on the sides before the middle; elytra with four yellow bands, more or less confluent, the anterior basal, the second and third frequently connected near suture, tip subtruncate, not spinose; legs ferruginous.

Antennæ stouter, the sixth joint with large impression in ♂; elytra more shining . . . . **brunnicornis.**

Antennæ more slender, joints 3—5 longer, sixth without impression in either sex . . . . **sinuatus.**

C.—Antennæ black ♂, partly yellow ♀; prothorax strongly punctured, much rounded on the sides before the middle; elytra yellow, with base and tip and three narrow bands black, often imperfect, tip subtruncate; legs yellow . . . . **balteatus.**

T. badius Newn., Ent. 1841, p. 69.
Length 13 mm. = .52 inch. *Hab.*—Fla., Ga., N. C., Ala.

T. zebratus Fab., 1801, Syst. El. ii, p. 364; Lec., J. A T. P. ser. 2, 1 p. 334; *aurigera* Newn., Ent. p. 70.
Length 10—13 mm. = .40—.52 inch. *Hab.*—Fla.; Ga., N. C., N. Y., Pa.

This species is often confused with *Leptura zebra*, from which it may be readily separated by the prothorax being only impressed at base, while in *L. zebra* it is deeply excavated.

T. sparsus Lec., Proc. Am. Phil. Soc. 1878, xvii, p. 614.
Length 9—10 mm. = .36—.40 inch. *Hab.*—Mich., L. Sup., Wis., Ohio.

T. lunatus Fab., 1801, l. c. p. 360; Hald., Trans. Am. Phil. x, p. 63; *arcuata*‖ Oliv., Ent. 1795, iv, 73, p. 32, t. 4, fig. 49.
Length 9—10 mm. = .36—.40 inch. *Hab.*—Fla., Ga., N. C , Texas.

T. velutinus Oliv., 1795, Ent. iv, l, c.; Hald., l. c.; *fugas* Fab., 1798, Syst. Ent. Suppl. p. 153; Hald., Proc. Ac. Phil. iv, p. 375; *rhois* Forst. i. litt.; Schön, Syn. Ins. i, 3, p. 485, not. g; *tenuior* Ky., Fn. Bor. Am. iv, p. 181; *nobilis* Newn., Ent. p. 67.
Length 10—14 mm. = .40—.56 inch. *Hab.*—Ga., Fla., Va., Pa., N. J., N. Y., N. H., Wis., Dak., Ind. T., Can. W., La., Me., Ohio.

T. lugubris Say, 1823, J. A. P. iii, p. 419; Hald., l. c.
Length 9—11 mm. = .36—.44 inch. *Hab.*—Ga., N. C., Va., Pa., N. Y., Mich., Ia., Mo. La., Mass., Can. W.

T. brunnicornis Lec., S. M. C. No. 264, 1873, p. 214.
Length 10 mm. = .40 inch. *Hab.*—Texas, Fla., Col., N. Mex.

T. sinuatus Newn., 1841, Ent. p. 70,
Length 10—13 mm. = .40—.52 inch. *Hab.*—Fla., Middle States, Dak., Mont., Kan., Ind. T., Tex , N. Ill., Neb., La., Md., Pa., Col., Mass., Mo., S. W. Va.

T. balteatus Horn, Trans. Am. Ent. Soc. vii, 1878, p. 55.
Length 11—13 mm. = .44—.52 inch. *Hab.*—Col., Ariz., Mont.

(To be continued.)

The field meeting of July 4th, at Jamesburg, was fairly well attended, though, owing to the threatening weather, many who had signified their intention of coming were deterred. Twenty-eight persons were present, Philadelphia furnishing the largest contingent. Two large wagons carried the party to the collecting grounds, where they scattered to do such collecting as the damp condition of things would allow. Before separating, however, the party were immortalized by means of the camera and an engineer brought for the purpose. At noon (very promptly) the party reassembled to discuss the goods provided by the intelligent efforts of the committee (bow from the writer as one of them), and it was noted that the dampness complained of as a bar to good collecting shifted its location, and as the external circumstances became dry, the internal wetness was not complained of. After the party had been again photographed—Dr. Skinner officiating at the milk-pitcher—the meeting organized by the election of Dr. George H. Horn, of Philadelphia, as President and Prof. J. B. Smith as Secretary. The Secretary's address was spoilt by the fact that at the most interesting period a young woman passed through the camp on her way to a Sunday-school picnic and so distracted the attention of all concerned (except the presiding officer) that the peroration came to an untimely end. It is beyond the power of the Secretary to give an accurate record of all that was done and perhaps it is well he should not; but the following were appointed as a committee to arrange for future meetings. For the Am. Ent. Soc., Dr. Skinner; for the Feltman Club, Mr. Wenzel; for the Newark Society, Mr. Machesney; for the Brooklyn Society, Prof. Smith. The further proceedings were informal and not to be recorded.—J. B. Smith, *Secretary*.

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ENTOMOLOGICA AMERICANA

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THE NORTH AMERICAN EUSTROTIINI.

BY A. RADCLIFFE GROTE, A. M.

The rather small sized, slender *Noctuidæ*, Boisduval's *Noctuophalænidæ*, which I have included in the Revised Check List under the tribe *Eustrotiini*, seem well placed low down in the *Noctuinæ*, since in several particulars and in their geometriform larvæ, which are 12- to 14-footed, they approach the *Catocalinæ*. The eyes are naked, and this feature is characteristic of the lower *Noctuidæ* and the *Geometridæ*, in which latter a single genus has hairy eyes so far as I am aware. The slender body is rather sparsely clothed with a mixed vestiture, sometimes mealy. The wings are rather weak, the primaries with the external margin comparatively straight and sometimes noticeably short, the hind wings full and rounded. Several genera have a marked tortriciform appearance, these are *Erotyla* (= *Agrophila*), of Europe, and *Fruva*, *Xanthoptera*, *Spragueia*, of our fauna. In the Revised Check List I have commenced the series with the genera having a clypeal protuberance, or an embossed front. In the first genus, *Azenia*, the armature of the head is disproportionately large. There is a tendency in the tortriciform genera which follow, to have the clypeus rugose or globose, the infra-clypeal plate prominent, so that there seems a reason for the arrangement there adopted; these frontal characters seem to gradually vanish in the other genera of the tribe, though the front is often swollen. All of the genera I have seen have the legs somewhat weak, and, so far as I am aware, the tibiæ unarmed.

The neuration affords certain plastic characteristics by which we may separate the genera. On the hind wings vein 5 is variably strong, sometimes wanting. On the fore wings the accessory cell is usually present, and differences are presented in the length and point of origin of veins 7 to 9. But the neuration of all the genera is not yet known. So far as my conclusions go we must, as yet, hesitate to accord too great value to neurational characters in classifying the moths as a whole. All characters must be used in classification, but we are not in a position, evidently, to make the neuration the crucial test. It is a general guide, but no more than a guide, to find the most natural position for a genus; keeping it alone in sight we may stray from the ends we propose to reach in arranging the objects of our studies.

Gen. **AZENIA** Grt. (1882)

Form very robust, like *Spragueia*, the wings long, primaries widening a little outwardly. Eyes naked. Labial palpi closely scaled, rather thick in appearance, a little longer than in *Xanthoptera*, lying obliquely across the face, hardly exceeding the clypeal projection. This latter very large, overshadowing the infra-clypeal plate, flattened, trilobed. Legs unarmed and thinly scaled. Two small, yellow Western species, having the facies of *Xanthoptera.*

1. **Azenia implora** Grt., Papilio, ii, 186.

Pale lemon-yellow; two ochrey dots in place of t. a. line. A median ochrey shade band, irregular and faint; one or two dots in place of t. p. line; minute points at base of the pale fringes. Hind wings white. Beneath whitish; costa of fore wings a little clouded. Head and thorax above like fore wings in color; the clypeal projection is distinctly tridentate. Abdomen pale, a little exceeding secondaries.

Arizona. Type in coll. Neumoegen.

2. **Azenia edentata** Grt., Can. Ent. xv, 25.

Dark yellow; fore wings with no apparent markings, except a small costal dot; fringes concolorous. Hind wings fuscous. Beneath yellowish; the fore wings darker shaded, and with a fuscous subterminal band. Thorax and head above dark yellow. The clypeal projection has its outer edge roundedly scalloped instead of forming three pointed teeth as in *implora.* Size small, like *implora.*

Arizona. Type in coll. Neumoegen.

Gen. **ESCARIA** Grt. (1882)

The wings are frail and rather wide, form like *Eustrotia* (*Erastria*), the body slender, with untufted abdomen. Eyes naked; labial palpi short. Front with a moderately prominent, rather wide, cup-shaped projection, nearly hidden by the erect vestiture, and with a central protuberance, not reaching beyond the rim of the cup, set in erect vestiture, which fills the cup itself. (The clypeal projections are thus evidently modifications of the clypeal surface. So far as I have observed they are not sexual peculiarities in the moths). Vestiture mixed, flattened hair and scales. The single species is of the size of *Eustrotia carneola.*

1. **Escaria clauda** Grt., Papilio ii, 186.

Grayish fuscous. In the male the ornamentation is better written. Orbicular paler, spherical; claviform moderate, its upper edge accentuated in black. Reniform lunate, moderate; the lines fine, perpendicular, edged with pale or whitish, especially in the female, which is darker, and the white s. t. line quite prominent. Hind wings pale fuscous, trace of median spot and extra mesial line. A vague terminal band. Beneath grayish fuscous, with common line and faint discal spots. One specimen, probably a variety, showed a reddish cast. Expanse 29 mil.

Arizona. Types in coll. Neumoegen.

The structure of the genera *Fruva* Grt., which is nearest to the European genus *Erotyla* in character, although in ornamentation the American genus *Spragueia* Grt. more nearly accords with the European *Erotyla trabealis* Sc. (= *sulphuralis* Linn.) *Xanthoptera* Guen., *Spragueia* Grt., and *Exyra* Grt., has been explained by me in Can. Ent. xi, 231, and need not be repeated here.

Gen. **PROTHYMIA** Hüb.

The palpi are curved and pointed, exceeding the front, the terminal joint long and attenuate. The fore wings have the external margin somewhat rounded; hind wings full. The abdomen is slightly flattened. These characters are drawn from the European *P. viridaria*, and to this genus the late Mr. Morrison referred two species from eastern North America, viz.: 1, *coccineifascia* Grt.; 2, *rosalba* Grt.; while I have described 3, *plana* Grt. from Arizona; and 4, *orgyiæ* Grt. from Texas. Of these *plana* resembles, in ornamentation, the European *Metoponia kœkeritziana* Hüb. I have not been able to compare the two insects.

Gen. **EUHERRICHIA** Grt. (1882)

This genus has the form of *Eustrotia*, but the purple colors of *Callopistria* (*Eriopus*), to which Hadenoid genus Guenée referred our North American species. Dr. Herrich-Schaeffer, in his "Correspondenz Blatt,'' first showed that Guenée had mistakenly classified our species, while I have described what I consider a true *Callopistria*, *C. strena* Grt., from Florida. congeneric with the European *purpureofascia* (= *pteridis* Fab.) and *latreillei*. The form is slender; the abdomen not exceeding the secondaries, tufted on the dorsal line at base, and especially on the third segment. Eyes naked; vestiture mixed, flattened scales and hairy. The wings are rather broad, entire; apices of primaries somewhat pointed, outer margin a little sinuate below apices, rounded submedially. Primaries 12-veined; accessory cell present; 9 out of 8 to apex, about half the length of 8; cell open; 3 twice further from 4 than 4 from 5 at base. Hind wings 8-veined; cell open; 3 and 4 arising together from extremity of submedian vein; 5 a little weaker, removed at base for about one-fifth the breadth of cell, indistinctly connected. The type is *monetifera* Guen., a well known species from eastern North America, with bright brown primaries, prettily flashed with silver. Other species are purply brown, sometimes with silvery lines.

Gen. **EUSTROTIA** Hüb.

Not only has this term priority over *Erastria* Treits., but *Erastria* is also previously used by Hübner for a genus of *Geometridæ*. The abdomen shows usually some dorsal tuftings. The fore wings are somewhat triangular, hind wings full. The accessory cell is present, and the genus shows neurational affinities with *Euherrichia*. In the Revised Check List I have referred sixteen North American species to this genus, some of which may be here briefly mentioned. Of the pale, bone-colored species, the types of *malaca* and *mitographa* are in coll. Am. Ent. Soc. Since I have not seen them again, nor have I examined other specimens, they should be re-examined. The ornamentation of *mitographa* is peculiar. Most numerous are the black and carneous-brown, typical species belonging to the *apicosa* (= *nigritula*) group. I have had my doubts whether *synochitis* is or is not the species figured and described by Guenée as *olivula*. Certainly the figure in the ''Species Général'' indifferently corresponds, and the description does not agree sufficiently. I have not been able to see Guenée's type.

Gen. **THALPOCHARES** Led.

This genus, so largely represented in Europe, has but few described North American species. It differs from *Eustrotia* by the neuration, there being no accessory cell on the primaries. A typical species appears to me to be *Thalpochares ætheria* Grt., (N. Am.

Ent. i, 47) from Florida. The other species enumerated by me in the Revised Check List have been incompletely studied as to the neuration. The species are most numerous in the south of Europe, where they are found on chalky or sandy districts, and it is related as characteristic of their habits, that, when alighting, after being disturbed in the daytime, they move their wings up and down several times before assuming a position of repose.

The European genera *Phothedes* Led., *Mesotrosta* Led., *Hæmerosia* Boisd., *Megalodes* Guen., with single species, have not been as yet recognized in North America. The tribe is represented in the European fauna by nine genera and forty-six species. In the Revised Check List I have given the names of sixteen genera and seventy-three North American species of *Eustrotiini.*

Mode of Oviposition of certain species of Odonata.

BY WM. BEUTENMULLER.

The female of *Libellula*, when laying eggs, hovers over the surface of the water and in coming in close proximity to the same, balances herself by the very rapid motion of her wings, curves her body downward and dips the tip of her abdomen into the water at short intervals, at the same time deposits from 25 to 40 eggs, which are surrounded by an invisible glutinous substance secreted at oviposition by means of which they adhere to aquatic plants, sticks, stones, or any other object they may come in contact with at the bottom of the water. In order to ascertain the number of eggs laid at each time the female *Libellula* dips her abdomen into the water, I captured at different times several specimens of *Libellula auripennis* and *L. pulchella* in act of ovipositing and held together their fore wing, allowing the hind wing to remain free and in action while I dipped the tip of their abdomen into a small vial filled with water and invariably at each dip about the same number of eggs as alluded to above were deposited. This experiment was repeated until the supply of eggs of my specimen for the time being was exhausted and the results were always the same.

The eggs leave the orifice of the oviduct in rapid succession, and are withheld in a bunch in the shallow depression at the tip of the abdomen until the same comes in contact with the water, then the eggs become separated while sinking, but become concentrated again at the bottom of the water by means of the glutinous substance which surrounds them.

As regards my observation on the mode of oviposition of *Li-*

bellula they agree with those made by Siebold (Germ. Zeit. Ent. ii, p. 421). The male of *Libellula*, it is stated by Siebold, retains its hold to the female and directs her movements while ovipositing. Müller (Ent. Mon. Mag. viii, p. 127) notices the method of oviposition of *L. flaveola* and confirms the assertions made by Siebold.

Although I have seen scores of *L. pulchella*, *L. auripennis*, *L. semifascia*, and many other species in the act of oviposition, the females were always destitute of the males, and only in one instance I saw a male retain its hold on the female while laying her eggs. The egg of *Libellula auripennis* is irregularly oval with very fine granulations, sordid white and semi-translucent, becoming amber-yellow before the young larva emerges. Length, ⅓ mm.; width, ¼ mm. A number of eggs which were laid on July 23d, at 6.30 P.M., disclosed the young larvæ on August 1st. The egg of *Libellula pulchella* is very similar to that of *L. auripennis*, in fact cannot be distinguished from it, except that it is a little more irregular in shape. Length, ⅓ mm., width, ¼ mm. Laid July 23d at 6 P.M. Young larva emerged July 30th.

The mode of oviposition of *Platythemis* (*P. trimaculata*) and *Diplax* (*D. berenice* and *D. rubicundula*) is identical with that of *Libellula*. The egg of the former is elliptical, or sub-elliptical, granulated, semi-translucent, pale yellowish white granulated, and before hatching becomes amber-yellow. Length, ½ mm.; width, ⅓ mm. Laid July 13th at 5 P.M. Young larva emerged July 23d. The eggs of the two latter species are oval, yellowish white, semi-translucent, and slightly granulated. Length, ½ mm.; width, $\frac{3}{0}$ mm. Laid August 12th. Young larva emerged August 22d. The habits of *Calopteryx*, *Agrion* and *Lestes*, differ entirely from that of *Libellula*. They deposit their eggs in a groove made by the ovipositors along the stems of water plants. Both *Agrion* and *Lestes* sometimes go beneath the water to lay their eggs.

Siebold (Wiegm. Archiv. pt. 1, p. 205, 1841) observed a female *Æschna* clinging to a plant dipping her body beneath the water and rubbing it up and down along the stem. Mr. W. T. Davis once saw a female *Æschna verticalis* go below the surface of a slow flowing spring, but has not seen the species deposit an egg, as is stated in one of the volumes of the "Zoölogical Record." I have seen at Sandy Hook, N. J., a species of *Æschna* laying eggs in the same manner as *Libellula* with the male directing her movements.

The best time I found to make observations and to capture the different species of *Odonata* is between sunset and dusk, or on a day partly clouded.

NOTES ON THE HABITS OF SOME SPECIES OF RHYNCHOPHORA.

BY FRANK H. CHITTENDEN.

In preparing the following notes my aim has been to record facts that are new, or comparatively so, regarding the food habits of certain of our Rhynchophorous Coleoptera. I find several other writers have recorded observations similar to my own, but so little has been written concerning the habits of this group that I have concluded to publish the results of my own personal observations, trusting that they will lose little of value by repetition, but may, on the contrary, serve in a measure to corroborate observations previously published. At the same time I have deemed it advisable in some instances to mention briefly in connection with my own notes certain facts that have been published elsewhere.

Very little is known concerning the early stages of the Rhynchophora, but the frequent occurrence of the imagines on plants of a particular genus or order, though not conclusive evidence that such constitute the food of the larvæ, is at least highly suggestive and worth recording.

In very many instances that have come to my notice the finding of a few specimens of a species of weevil under certain conditions on a plant, point to it as a probable food-plant; the discovery even of a single individual—*e. g.* a female in the act of depositing her eggs, or of a pair of beetles copulating on a plant is well worth noting down, as the repetition of such occurrence may be taken as more than mere presumptive evidence that the same plant serves as food for the larvæ. The finding of the first specimen is followed by another and another until at last that, which was at first a suspicion, becomes an established fact.

As few weevils are short lived, and not so restricted as some beetles appear to be in the time of their appearance and disappearance, I have, in the majority of cases, simply recorded the dates in months. The greater part of these observations were made at Ithaca, N. Y., and the remainder in the neighborhood of New York City.

Eugnamptus angustatus Hbst. and *E. collaris* Fab., I have several times taken together while beating butternut trees, also on chestnut, and on hickory *in copula* July 10th to August 7th. These two forms are usually found together, and are quite generally believed to be identical.

Phyxelis rigidus Say hibernates under piles of weeds and rubbish in fields and gardens, where it may be found early in Spring and late in the Autumn. I have always supposed that this species bred in some common weed.

Pandeletejus hilaris Hbst. is common on beech trees in June, a few pairs observed *in copula* at this time. According to Harris, the larvæ live in the trunks of the white oak.

Scythropus elegans Coup. appears sometimes in great abundance in the latter part of April continuing in constantly decreasing numbers into the middle of July, upon the foliage of pine trees, occurring most commonly at Ithaca, N. Y., on the white pine (*Pinus strobus*). Individuals from a single locality exhibit a great variety of coloration. In the great majority the normal ground color is a rather bright fawn, tinged with a more or less coppery lustre, some are decidedly cupreous, even brilliant, inclining to a pinkish hue, and others are of an equally brilliant metallic green. In specimens taken late in the season the scales which produce this variety of coloring have been worn off, or have faded, leaving the body a nearly uniform dull cinereous. In such individuals the humeri have become denuded, and the ground color is then much the same as the sutures, which are normally nearly white. One specimen taken early in the season retains its deciduous mandibular appendages.

Ithycerus noveboracensis Sch. is known to breed in the twigs of bur-oak, and the beetle is injurious to the buds of a variety of fruit and forest trees. All the specimens that I have ever taken were on beeches, and I suspect that this is a favorite food-plant for both larvæ and beetles. Mr. W. H. Harrington states (Ann. Rep. Ent. Soc. Ont. for 1880, p. 52) that he has frequently found the beetle on beeches in June, the sexes copulating at this time. It also occurs in May and July.

Apion nigrum Hbst. occurs quite commonly on the leaves of the locust (*Robinia pseudacacia*). The leaves are often seen riddled with minute holes, and as the *Apions* and *Agrilus egenus* are the only insects observed by me in any numbers on this tree, and the former occur in the greatest abundance the blame naturally attaches to them. July.

A. rostrum Say occurs literally in thousands on *Baptisia tinctoria*, the wild indigo plant, and according to LeConte (Rhynch. of America North of Mexico, p. 411) on *B. leuçantha* also. It may be found in this neighborhood in May and June.

Apion fraternum Smith, I have observed sometimes in great numbers on the leaves of two species or varieties of *Lespedeza*. July and August.

Listronotus. During the past year Mr. C. M. Weed has published an account of the life-history of *L. latiusculus* Boh., which he found in all stages of growth in the stalks and seed-heads of *Sagittaria variabilis.* Some six years ago, while sweeping a small patch of aquatic plants composed almost entirely of this species and a few specimens of a species of *Carex*, I took *tuberosus* Lec. (July and August), *caudatus* Say (July), and *appendiculatus* one pair *in copula* (June, July and August). The last named species I have recently observed on the flower-heads of *Sagittaria.* The habits of all these species are doubtless very similar. Mr. William Juelich has found *appendiculatus* breeding in the lower parts of the stems of some species of reed.

Eudocimus mannerheimii Boh., a rare species, has not been taken in this vicinity to my knowledge for many years. It once occurred, so Mr. Juelich tells me, rather abundantly in the neighborhood of Hoboken, N. J., under the bark of the swamp cedars.

Lixus concavus Say, I have usually taken on a common broad leaved variety of dock (*Rumex*), and less often on rhubarb. As others have made the same observations, I think it more than likely that the species breeds in the stems of both as well as in *Helianthus* and *Chenopodium* as stated elsewhere (F. M. Webster, Ent. Am. vol. v, p. 11). The rosin-weed (*Silphium*) is also mentioned as a possible food-plant.

Barytychius discoideus Lec. Several specimens taken years ago on a small, low and rather common weed, species not determined. May 28th to July 11th.

Otidocephalus chevrolatii Horn. A single specimen was found in a jar in which had been placed a piece of basswood that had been attacked by some species of borers. It is a matter of doubt whether the insect actually bred from the wood or had simply crawled into some hole or crevice to hibernate. I have taken the adult insects while beating hickories and chestnuts during the past July. An allied species, *O. lævicollis* Horn, has been hatched by Dr. C. V. Riley from the galls of a Cynipid on oak.

Magdalis olyra Hbst. breeds often in abundance under the bark of hickory trees, the larvæ subsisting on the inner bark. I have seen a branch about four inches in diameter infested in fully eight feet of its length by this species. Some four feet or more of the bark had been loosened, exposing the wood. There was scarcely a space larger than the tip of one's finger on this branch that was not completely riddled with the little round holes bored by the weevils in their egress through the bark, and I counted in one case a dozen such holes to a square inch of surface. The larval mines, as observable on the inner side of the bark, are longitudinal, sinuous and only moderately irregular. In specimens that have been preserved there were so many larvæ at work that their tunnels sometimes crossed and recrossed, and were at times interrupted by burrows made by *Chrysobothris femorata*, so that individual mines could with extreme difficulty be traced throughout their entire length. The bark was almost entirely free from the wood, a layer of sawdust-like castings, nearly as hard as chalk, and an eighth of an inch thick, intervening.

There was evidence that a large proportion of the larvæ had been destroyed by a Hymenopterous parasite, and that many had fallen prey to woodpeckers. The beetles occurred last year at Staten Island, on hickories, in May.

Magdalis hispoides Lec. Bred from larvæ found February 22d, in a twig of pitch pine (*Pinus rigida*), under the bark. They so closely resemble the larvæ of *Magdalis armicollis*, figured in Le Baron's Fourth Ills. Rep't., that I had no difficulty in identifying them as of this genus. The pupa was first observed March 7th. On the 28th the pupa was found with the mandibles and eyes black, rostrum reddish and caudal half of elytra dark. April 1st it had transformed. The head, eyes and dorsal surface were red, elytra uncolored and ventral surface pale. On the following day the imago appeared perfectly colored. My observations indicate the duration of the pupal stage as about four weeks. The perfect insect occurs on the branches or foliage of pines in June and July, one specimen being taken as early as the 21st of May.

Orchestes pallicornis Say and *O. niger* Horn were taken together in July on the leaves of low willows.

Gymnetron teter Fab., the common mullein weevil, I have taken from the seeds in which it breeds in September; sometimes nearly every seed conceals its little occupant. The beetle occurs on the plant in June and July.

Conotrachelus juglandis Lec. breeds in the green fruit of the butternut, in the same way that its congener, *C. nenuphar* breeds in plums and cherries. It is said to occur also on the walnut. May to October. Other species of the genus are known to live at the expense of deciduous trees. *C. seniculus* Lec., *elegans* Say and *posticatus* Boh., I have beaten from forest trees, but as I have taken none of them in abundance my notes are not of a character to warrant any conjectures regarding their food-habits.

Rhyssematus lineaticollis Say is on record as breeding in the seed-pods of *Asclepias tuberosa* and *incarnata*. I have twice had occasion to observe the adult insect with rostrum deeply imbedded in the stalk of the milkweed, and have kept specimens in confinement feeding upon the juice of the same. May, June and July.

Cryptorhynchus bisignatus Say. Several specimens taken in the latter part of May at Clifton, N. J., on a chestnut log infested with *Leptostylus macula*, and during the last part of June fifteen or sixteen examples were found on another log of chestnut, some of them copulating; also taken on the trunk of a living beech tree infested with Scolytids. It is probable that this species has similar habits to *C. parochus*, living under the bark of chestnut and possibly beech.

C. parochus Hbst. is known to breed under butternut bark, which appears to be its favorite food tree. Though I have taken this insect often during several years it was always on butternut. April and May.

Acoptus suturalis Lec. lives in the dead wood of beech trees. I have found the imagines in the wood March 27th to April 20th in company with larvæ apparently of the same species. One of these larvæ taken May 26th appeared about to pupate. The beetles were crawling on the trunk of the tree early in July.

Mononychus vulpeculus Germ. breeds in the seed-pods of the blue flag (*Iris versicolor*), the beetle issuing in the fall. The perfect insect occurs in the flowers of the blue flag and the common crane's bill (*Geranium maculatum*) in May and June. It has been stated (v. Say, LeConte, ed. p. 286) to occur on the flowers of *Ceanothus americanus* and *Verbascum thapsus*.

Cœliodes flavicaudis Boh. occurs in the greatest abundance on the common nettle (*Urtica dioica*) in May, June and July.

C. acephalus Say is also abundant along the coast of New Jersey on the evening primrose (*Oenothera biennis*). June, July and August.

Ceutorhynchus septentrionalis Gyll. is another common species sometimes found in swarms on the wild mustard (*Sisymbrium officinale*).

Rhinoncus pyrrhopus Lec. A pair of these little beetles were taken *in coitu* on a common species of dock (*Rumex*), and being confined in a small vial with a part of a dock leaf consumed it almost entirely within a week. The species has also been observed by Mr. M. L. Linell on a species of *Rumex*. June.

Centrinus lineicollis Lec. A number of specimens were taken at one time on the New Jersey tea plant (*Ceanothus americanus*) July 9th.

Balaninus. The recent publication of Dr. John Hamilton on the food habits of the genus leave little for me to add, but a few lines on my experience may be of interest.

B. uniformis Lec. and *B. quercus* Horn were taken in company in nearly equal numbers, and almost invariably *in coitu* upon acorns during September. From finding them on only two trees in separate groves of oaks I was led to believe that they favored particular varieties or species, if not individual trees. On almost every acorn on these two trees a pair, and sometimes two pairs were found, while the surrounding oaks yielded not a single specimen.

B. rectus Say I have bred from chestnuts. A few infested nuts were placed in a small, wide-mouthed bottle nearly filled with coarse sandy soil. A few days afterward three larvæ deserted their old homes and at once penetrated to the bottom of the breeding-bottle, where they formed little round cells in the earth. Here through the glass their bodies were plainly visible, where they remained without change till the following fall. They thus passed nearly a year as inactive larvæ. The pupa were not seen at all, and this stage must necessarily be of brief duration. The beetles, in good healthy condition, were taken from their earthen cells September 28th and kept without food till October 20th. As many as six half-grown larvæ were taken from a single chestnut, though one specimen is the usual number. The larvæ of all three species may be found in the nuts as late as November, at which time they enter the ground to undergo their transformations.

Dryophthorus corticalis develops under the bark of *Pinus rigida* March and April.

Himatium conicum Lec. One specimen was taken by me at South Woodstock, Conn., October 22d, under bark of *Pinus strobus* infested by *Tomicus pini.* Mr. E. A. Schwarz (Pr. Ent. Soc. Wash. vol. i, p. 233) has found this species breeding under tulip bark (*Liriodendron*), and our other species, *errans*, which he remarks, is with difficulty to be distinguished from it, occurs under pine bark. Is it possible that the two species are distinct?

Rhyncholus brunneus Mann. is possessed of similar habits to *Phlœophagus* and *Stenoscelis*, of which mention has been made in a previous number (p. 99). I have found it only once, but at that time some twenty-five or thirty specimens were taken from a small piece of cherry wood (*Prunus serotina*). April.

The species of *Cossonus* are subcortical. *C. concinnus* Boh. and *corticola* Say infest pines, often occurring in abundance. July.

NEW SPECIES OF ARCTIANS.

BY B. NEUMOEGEN.

Arctia favorita n. sp.—Antennæ rather short, brownish black. Head, collar, prothorax, thorax and patagiæ of coral-red, with the three usual black longitudinal stripes on patagiæ and thorax, the two black spots on prothorax and the black dot on head between base of antennæ. Body coral-red, with a black dorsal line and a lateral row of small black dots. Legs yellowish red, with black maculations at joints. Beneath, thorax and abdomen with lighter coral, the latter having black segmentary stripes. Legs blackish. Primaries black, with the following maculations in straw-yellow; a broad horizontal line running parallel with inner margin from base to outer margin and forking at anal angle. Between this line and inner margin, appending to the former, three irregular spots. Two transverse lines starting from costa, joining and resting on horizontal line, thus enclosing discal spot. Between anterior transverse line and outer margin the usual zigzag line from costa to horizontal line. A few irregular dots on costa between base and interior transverse line; inner margin fringed coral; outer margin has fringes of straw-yellow. All these maculations of straw-yellow show invariably a centre line of beautiful bright coral color. Secondaries bright coral with paler fringes; a black discal spot; three large black submarginal spots from apex to anal angle, the centre spot being largest. Broad black band along costa and outer margin, being toothed between submarginal spots. Beneath, primaries and secondaries as above. Expanse of wings 35—40 mm. Length of body 13—14 mm.

Hab.—Idaho Springs, Colorado. Types, two males; coll. B. Neumoegen; caught by Mr. D. Bruce.

This insect belongs to the *autholea* group, and, aside from its own peculiarities, is easily distinguishable by its bright coral centre lines.

Euchætes conspicua n. sp.—Head and collar brick-red. Prothorax, thorax and patagiæ light gray; marginal lines of thorax and patagiæ brick-red. Abdomen deep orange, with faint traces of black dorsal dots and black lateral dots. Beneath, abdomen as well as the legs of light gray. Primaries and secondaries light gray; fringes concolorous. On primaries along costa and inner margin a conspicuous line of bright brick-red, terminating within apex and anal angle respectively; a faint hue of brick-red along anal margin of secondaries. Beneath as above, with a slight fringe of brick-red at base. Expanse of wings 30 mm. Length of body 9 mm.

Hab.—Golden, Colorado. Types, two males; coll. B. Neumoegen; caught by Mr. D. Bruce.

This insect comes near *E. cadaverosa* Grote. It is easily recognized by its conspicuous costal lines. *E. cadaverosa* is found in Cuba and Texas, whilst this is the Colorado representative.

Arachnis zuni n. sp.—Head white; collar light yellow. Prothorax and patagiæ of slate color with black marginal lines. At inner centre of patagiæ this lines recedes, forming a lunular spot of pure white. Antennæ simple, black below, and alternately black and white above, with white base and black tips. Thorax white, with a broad central band of slate color, fringed with outer black lines, constricted in the middle and forking out at lower part, forming thus an irregular lunular spot of pure white. In the middle of this central band a white irregular dot. Thorax beneath white, with marginal stripes of slate. Legs slate, with irregular white spots, encircled by black rings, at intersection of joints. First joint of coxæ above the largest part of bright yellow, limited by two black cross lines; beneath white. Tibiæ and tarsi white beneath first joints. Abdomen bright yellow, with dorsal and lateral black bands, white beneath. Primaries of slate color, more intense towards base, with the following maculations of pure white. Four of them starting at base of costa and resting on discal vein, consequently becoming larger in size towards apex; all of irregular shape from nearly semicircular degenerating into irregular square. The three blotches nearest base connected by small constrictions. The fourth blotch irregularly square and separate. Between fourth blotch and apex, without touching latter, a large, irregular, crescent band, resting on costa and forming a costal, semilunular spot of slate, having at its inner extremity a large hook, pointed outwardly and resting on first median vein. At outer margin and intersection of veins minute triangular spots. Along outer margin, curving inwardly at centre and swinging from anal angle upward beyond first median nerve, where it tapers off, an irregular dentated band, bulging out above anal angle and touching outer margin. Along inner margin five irregular blotches, the third running across entire interspace and tapering off, touching discal vein. This third blotch is the largest of the five, the two remaining between this and anal angle being only very small, triangular marks. Some small, irregular dots in interspace of median and submedian veins and above basal half of inner margin. All maculations are encircled by black lines. Secondaries white, about one-fourth smaller than primaries, having a tendency to be caudate, and about half as long as abdomen. Along costa and anal margin bright yellow, the hairy tuft of latter quite pronounced in color. A terminal series of slate spots, a discal spot of lunular shape, and a few dots between latter and interspaces of base and outer margin. A large oval spot on costa near apex slate color, encircled by a black ring. Below, primaries and secondaries as above, only that the four costal blotches of primaries are of a slate instead of white, and that on costa of secondaries, instead of one, there are three blotches of slate color, the interspace formed by the two nearest base being bright yellow. The interspace on primaries between costal blotches being equally of bright yellow. Expanse of wings 47 mm. Length of body 18 mm.

Hab.—Las Vegas, N. Mexico. Type, one male; coll. B. Neumoegen; reared from the chrysalis brought home by Mr. H. Meeske, Autumn, 1889.

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How many broods of the "Elm leaf beetle" are there in the latitude of New York? New Brunswick has positively but one. Some collectors still claim two! Please send in your observations.

FOOD HABITS OF SOME CHRYSOMELIDÆ.

BY WM. BEUTENMULLER.

Donacia.—The various species of this genus occur upon the leaves of aquatic plants, especially water-lilies (*Nymphæa* and *Nuphar*). I have taken *D. palmata*, *D. piscatrix*, *D. subtilis*, *D. femorata*, *D. æqualis* and *D. flavipes* upon these plants. No larva of any American species has yet been described; they undoubtedly have the same habits as the European species which bore in the stems of water-lilies.

Lema brunnicollis and *L. collaris.*—Both these species live on the thistle; the former I have taken at Enterprise, Fla., and the latter species was bred by Coquillett (Can. Ent. xv, p. 22).

Lema solani and *L. conjuncta* I have found upon the leaves of *Solanum carolinense* at Enterprise, Fla., in May.

Lema trilineata lives upon *Datura stramonium*, potato and *Physalis.*

Crioceris asparagi and *C. 13-punctata* both feed upon the leaves of asparagus.

Coscinoptera dominicana lives in a case on sumac (Harris' Corr. p. 76). The insect has also been beaten from oak, apple, plum and sassafras (Riley, 6th Mo. Rep. p. 127).

Chlamys plicata.—I have bred this case bearer from the leaves of blackberry and hazel; also found on sycamore and oak.

Exema gibber and *E. conspersa.*—I raised these two species from a narrow leaved species of aster.

Cryptocephalus 4-maculatus is found on oak. *C. binomis* I have taken on blackberry in Florida. *C. venustus* also inhabits the blackberry. *C. aulicus* occurs upon a small leaved huckleberry in Florida, as also does *Griburius larvatus.*

Pachybrachys tridens feeds on poison ivy (*Rhus toxicodendron*). *P. luridus* may be found on wild indigo (*Baptisia tinctoria*). *P. livens* inhabits the willow. *P. femoratus* has been taken on pine by Mr. Harrington (Can. Ent. xvi, p. 97).

Bassareus formosus lives on various species of alder. *B. mammifer* may be found on blackberry.

Glyptocelis pubescens.—I have taken this species at Fordham, N. Y., on hemlock; also found on pine (Fitch).

Chrysochus auratus occurs in considerable numbers upon the leaves of dog-bane (*Apocynum*). The larva of this common species has not yet been recorded. I have searched for it in vain upon the leaves of the plant the imago infests. Can the larva, perhaps, in some way live upon the roots?

Tymnes tricolor may be found on blackberry, hornbeam and various other plants.

Adoxus vitis feeds upon Virginian creeper (*Ampelopsis*) and grape.

Metachroma pallida has been bred from the leaves of poplar by Coquillett (Can. Ent. xv, p. 21).

Paria aterrima, *Graphops pubescens* and *Colaspis brunnea*.—These three species infest the roots of the strawberry.

Doryphora clivicollis feeds upon the underside of the leaves of various species of milkweed (*Asclepias*).

Doryphora 11-lineata.—The early stages of this species have been described and figured by Duges (Ann. Ent. Soc. Belg. xxviii, p. 1, pl. 1). It feeds on *Solanum tardum* in Mexico.

Doryphora 10-lineata.—Besides the well known food-plant (the potato) of this species it has also been found living upon the following plants: egg-plant, *Datura stramonium*, henbane (*Hyoscyamus*), ground-cherry (*Physalis*), apple of Peru (*Nicandra*), tobacco, belladonna, petunia and cabbage (Glover and Riley).

Doryphora juncta lives on *Solanum carolinense*.

Chrysomela multiguttata feeds on hazel (Coquillett, Can. Ent. xv, 22). *C. scalaris* lives on willow, linden, elm and basswood. *C. philadelphica* and *C. bigsbyana* infest various species of willow.

Chrysomela similis was bred from ragweed (*Ambrosia artemisiæfolia*) and *Bidens frondosa* by Coquillett (Can. Ent. xv, 22).

Chrysomela præcelsis lives on *Ipomea* and *Calystegia* (Hamilton, Can. Ent. xx, p. 66).

Chryomela lunata I have taken this beetle on the leaves of various species of wild roses, upon which the larva also undoubtedly lives.

Prasocuris phellandrii.—The food-plant of this beetle has not yet been recorded in this country. In Europe it lives on *Cicuta virosa*.

Prasocuris varipes lives on a species of buttercup (*Ranunculus*) in April.

Gastroidea polygoni feed upon different species of knotweed (*Polygonum*). *G. cyanea* I bred from *Rumex*. *G. formosa* lives on a species of rhubarb in Arizona.

Lina tremulæ, *L. lapponica*, *L. scripta* and *Phyllodecta vulgatissima*.—All these species infest various species of willow and poplar.

Monocesta coryli is injurious to various species of elm (Riley, Rep. U. S. Dept. Agr. p. 246, 1878); also feeds on hazel.

Agelastica halensis lives in *Galium verum* in Europe. No record of its food-plants in this country has as yet been made.

Diabrotica vittata bores in the stems and roots of pumpkin and squash vines. *D. longicornis* feeds on the roots of corn (Forbes, 2d Rep. Nox. Ins. Ill. p. 55).

Trirhabda brevicollis.—I have taken this insect in abundance on prickly ash at Kissimmee, Fla. April.

Trirhabda tomentosa lives on various species of golden rod and asters (Beutenmuller, Can. Ent. xxii, p. 36).

Galeruca xanthomelæna.—This insect infests the elm, blighting the leaves and rendering almost worthless the trees they attacked. The pest within the last three or four years has made its appearance in considerable numbers in New York City, and is doing great mischief to the trees of our avenues and parks.

Galeruca marginella lives on *Myrica gale* (Packard Guide, p. 505).

Galeruca sagittariæ may be found in June and July in its various stages on the leaves of water-lilies (*Nuphar*) and *Sagittariæ.*

Galeruca maritima.—I have taken this insect in abundance on a species of grass found behind the sand-dunes along the sea-shore of Long Island.

Blepharida rhois feeds on sumac (Riley, 6th Mo. Rep. p. 118–122).

Disonycha limbicollis, *D. pallipes*, *D. punctigera*, *D. pennsylvanica* and *D. rufa?*—I found all these on various species of *Polygonum.* The larvæ undoubtedly also live in some way upon this plant. *D. collaris* was bred by Miss Murtfeldt, from the leaves of *Spinach* and *Chenopodium album* (Bull. No. 22, U. S. Div. Ent. p. 76).

Haltica chalybea lives on elm and grape. *H. bimarginata* infests the alder (Lintner, 4th Rep. Nox. Ins. p. 98). *H. foliacea* feeds on apple and hawthorn (Murtfeldt, Insect Life, i, p. 74–76). *H. marevagans* I have bred from evening primrose.

Crepidodera cucumeris is found in numbers on the leaves of cucumber, potato and *Datura stramonium.* *C. helxines* live on willow and poplar.

C. rufipes was taken by Lintner on apple. I found it on locust last May at Washington, D. C.

Phyllotreta vittata may be found on cabbage and other cruciferous plants. *P. zimmermanii* mines the leaves of peppergrass (Riley, Rep. U. S. Dept. Agric. p. 304, 1884). *P. chalybeipennis* mines the leaves of *Cakile americana.*

Dibolia area infests the turnip by burrowing in the leaf stems (Comstock, Rep. U. S. Dept. Agric. p. 248. 1879). I also found the insect on the leaves of *Plantago*

Microrhopala vittata mines the leaves of golden rod (Harris, Journ. Bost. Soc. Nat. Hist. i, p. 147).

Odontota rubra mines the leaves of apple and linden; the perfect insect may also be found on white birch, hornbeam, cherry, juneberry (*Amelanchier*) and *Pyrus arbutifolia*. *O. nervosa* I bred from asters and *Eupatorium*. *O. dorsalis* mines the leaves of locust and acacia.

Physonota unipunctata feeds on sunflower (*Monarda fistula*).

Cassida bivittata, *C. nigripes*.—Both these species feed on the sweet potato.

Coptocycla guttata, *C. aurichalcea* live upon morning-glory and sweet potato. *C. clavata* I bred from a species of nightshade (*Solanum*).

Chelymorpha argus is also found on morning-glory and other allied plants.

Porphyraspis cyanea I found in considerable numbers on the underside of the leaves of the palmetto at Enterprise, Fla.

In a series of articles in "Societas Entomologica," Dr. A. Troska gives the results of some very interesting experiments in feeding Lepidopterous pupæ, principally with sugar water. He paints the wing cases and some other parts of the body, carefully avoiding the stigmata, and attains unusually large and fine specimens. Painting with oxide of silver just before development, reduces size and intensifies, while it narrows and defines the maculation. The conclusion is that pupæ take considerable nourishment by endosmosis, and that varieties can be produced by experiment.

It was also found that where the specimens experimented upon were parasitized, the parasites resulting were remarkably fine and large, with brilliant colors, and that they evidently benefitted by the feeding of the host.

A NEW BOMBYCIA.

BY JOHN B. SMITH.

Bombycia candida sp. nov.—Ground color fuscous brown; neck yellow; a black line across middle of thorax. Primaries: basal space largely white, except close to thorax, and at inner margin; median space white powdered in the costal region, and a broad white costal shade beyond t. p. line, narrowing to apex. T. a. line outcurved on costa, then nearly straight to hind margin. T. p. line from middle of costal margin incurved, slightly angulated outwardly on median vein, thence outwardly oblique and sinuate to hind margin about one-quarter from anal angle. S. t. line traceable as a vague whitish shade, preceded by an equally vague blackish shade, except just above the anal angle, where both white and blackish shades are obvious. Beyond the t. p. line there is a rusty shade through the centre of the wing to the outer margin. Narrow, irregular, transverse strigæ are obvious through the dark parts of the wing; a continuous black terminal line; two longitudinal black dashes before apex. Secondaries fuscous to the narrow, irregular median line, beyond which it is more yellowish and marked with blackish, irregular transverse strigæ. Beneath yellowish fuscous, with distinct black discal spots on all wings, mottled with blackish transverse strigæ; primaries darker outwardly. Expands 1.55 inch.; 39 mm.

Hab.—Florida.

A single male specimen from Mrs. Slosson's collection. It is an easily recognizable species, very different from anything else known to me, though apparently similar to *B. magnifica* Strk. in type. It is not congeneric with *semicircularis* or *improvisa*, but I leave it with these for the present, as I do not know whether it does not agree with some of the European genera into which *Cymatophora* (*Bombycia* Grt.), has been divided. The body is slight, abdomen slender, considerably exceeding hind angles of secondaries. Head rather prominent, front bulging, protuberant, but not tuberculate; palpi short, weak, not reaching middle of front; antennæ of male lengthily bipectinated. Legs stout, tibiæ not spinose. Primaries large, frail in appearance, apices drawn out, outer margin oblique, rounded, without a distinct hind or anal angle.

Mr. Strecker says of his species that the secondaries are remarkably produced at outer angle, which is not the case here.

◆

Will those who took part in the field meeting at Jamesburg please make a list of their captures on that occasion, and send to the editor. So many good species have been mentioned that it would be instructive to see how many species were taken by collectors who did not gather indiscriminately all that came to their view.

OBITUARY

On Wednesday, Aug. 13, 1890, one of Albany's best known collectors of LEPIDOPTERA, Mr. Otto von Meske, died. Mr. Meske was born Feb. 5, 1837, near Kœnigsberg, Germany. Educated for a military career, in which his ancestors as well as his brothers have gained distinction, his artistic instincts were so strong that they induced him to throw up this life as soon as he could manage to do so and migrate to Paris, where, for two years, he studied with some of the leading portrait artists. At the age of twenty-one or twenty-two he came to New York, then to Albany, where he married and settled. His entomological interest began soon after his marriage, and increased to enthusiasm, when, with Dr. Bailey, Mr. Hill and Dr. Lintner, he made Albany and Center Station famous for the remarkable captures in Noctuidæ. Of this quartette Dr. Lintner alone remains. To Mr. Meske, Dr. Speyer owed most of the American material upon which his papers on our fauna are based. Some ten years since, the nervous disease, which finally resulted in death, made its first appearance, and necessitated a stop of active collecting. About five years ago his collection was sold to the U. S. National Museum, where it still remains and forms not the least valuable part of that grand collection of LEPIDOPTERA. Soon after, the disease made such progress as to gradually paralyze the lower extremities, and despite the best medical advice and treatment, Mr. Meske became utterly helpless so far as moving about was concerned, though retaining the use of arms and brain unimpaired to the last. About January, 1890, the end began approaching, and constant and continuous suffering slowly sapped a wonderful vitality, resulting in death at the date above given. Mr. Meske never published, but the frequent references in the writings of Grote, Speyer, Lintner, Harvey and Morrison, show that he did not conceal the facts observed by him. Mr. Meske leaves a wife and seven children surviving him. None of the children inherit their father's love for Entomology, though the interest of the family in Entomologists is kept up by the eldest daughter, who became Mrs. Editor not so many years ago.

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Subscriptions and other business communications should be sent to the treasurer.

Insects for identification, or as donations to the collection of the Society, go to either of the curators.

ENTOMOLOGICA AMERICANA

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PREPARATORY STAGES OF DATANA PALMII Beut.

BY HARRISON G. DYAR.

EGG.—Subspherical, flattened and slightly hollowed at the base. The top is centrally strongly depressed, this depression surrounded by a circular elevated ridge of considerable thickness. In the centre of the vertex is a circular punctiform depression, resembling a little hole. Color uniform sublustrous white. Diameter 1.1 mm.; height 8 mm.

Laid in masses of 75 or less on the underside of a leaf of the food-plant, usually near the top of the bush. The larva hatches by eating away the top of the egg, but leaves the sides untouched.

FIRST STAGE.—Head black and shining; width .5 mm. Body brown, with four lateral and three ventral dull yellowish stripes wider than the intervening spaces. Cervical shield, anal plate and feet, black. The hairs arise from minute blackish warts.

During this stage the larvæ eat only the parenchyma of the leaf and sit with the extremities of their bodies elevated like the other species of the genus.

SECOND STAGE.—Head higher than wide, flat in front, black (in a few examples brownish), smooth and shining. Width .9 mm. Furnished with a few pale hairs. Body reddish brown, the stripes yellowish. Cervical shield, anal plate and feet shining black. During this and subsequent stages the larvæ eat the whole leaf, remaining together upon one twig until it is defoliated.

THIRD STAGE.—Head black to blackish red in different examples; eyes and mouth black. Width 1.6 mm. Body dark reddish brown, the stripes dull yellow, arranged as in the next stage, the subventral ones interrupted at the bases of the legs and correspondingly on the legless segments. Cervical shield, anal plate, thoracic and anal feet and the abdominal feet outwardly, black. A few short pale hairs.

FOURTH STAGE.—Head higher than wide, rounded, quite flat in front, depressed a little at the sutures at the top of the triangular plate and furnished with a few hairs. Color black, or blackish red to light mahogany-red, or even orange tinted in different examples of the same brood, the eyes and jaws black, labium and antennæ yellowish, the latter black ringed. Body black, becoming brownish, four lateral stripes, a subventral and ventral one pale yellow, the lateral ones becoming almost white in some examples, all nearly as wide as the intervening spaces. They run nearly to the anterior edge of joint 2, except the first and second lateral, which stop at the cervical shield and end before reaching the anal plate, except the third lateral and the ventral. The subventral line is interrupted by the light reddish bases of the legs and by reddish spots on the legless segments, except on joint 13. Cervical shield, anal plates, thoracic feet and the abdominal outwardly, shiny black; the anal plates punctured and narrowly bordered with ocher yellow. In some examples with red heads this border is broader, and the cervical shield is partly ochreous-orange. Hair whitish, thin and short, growing from minute black tubercles.

FIFTH STAGE.—Head as high as wide, rounded, a little flattened at the extreme front, depressed at the sutures at the top of the triangular plate and very minutely punctured. A few blackish hairs. Color light reddish orange, or with a brownish tinge not unlike the color of a cherry stone. Labium and antennæ paler, the latter with two black rings; jaws black; eyes blackish. Body black, the stripes pale yellow, the lateral ones in some examples becoming white and in a few canary-yellow, narrower than the intervening spaces, continuous from cervical shield and the anterior edge of joint 2, except the subventral, somewhat interrupted and irregular on joints 12 and 13, and barely reaching the anal plate, except the third lateral. Cervical shield, anal plate and abdominal feet, except an outward blackish band on the latter, concolorous with the head. Bases of all the legs (except the anal) and corresponding spots on the legless segments darker red. Thoracic and anal feet black. Hair thin, about 5 mm. long, with some short, more numerous, fine black hairs seen with a lens. At maturity the head is more of a brownish red. Length about 50 mm.

Pupation occurs in a subterraneous cell, and the Winter is passed in this state.

PUPA.—Similar in shape and color to those of the other species of *Datana* and not to be distinguished from them. The two cremasters are short, each with three spines, of which the middle one is usually shortest.

FOOD PLANT.—*Vaccinium stamineum*. Larvæ from Ulster County, N. Y.

Abstract of the Proceedings of the Entomological Club of the A. A. A. S.

The club met August 20th in the State House at Indianapolis, 26 persons attending the meetings. The President, Prof. A. J. Cook, delivered as his annual address an essay upon teaching Entomology, which was discussed by Messrs. Weed and Osborn.

Mr. Weed read a paper upon the life-history of the "evening primrose curculio (*Tyloderma foveolatum*)" and upon a Braconid parasite of the same. The paper was commented on by Mr. Webster.

Mr. Fletcher presented some notes upon the injuries caused by the Hessian Fly, the wheat-stem maggot and an undetermined species of *Oscinis*. The *Oscinis* was probably *variabilis* according to Dr. Williston.

This note produced extensive discussion by Messrs. Cook, Garman, Osborn, Atwood and Webster.

A paper on the subject of American Silk-spinners, by Mr. Edward L. Graef, was read by the Secretary. The author expresses his belief that some of the American *Saturniidæ* might be made useful for the production of native silk, and offers a prize of $50 for the best practical plans for accomplishing this purpose.

August 21st, Mr. Weed read a paper on the "Food-plants of the Clover Stem Borer (*Languria mozardi*);" he has found the larva feeding on fifteen species of plants. The paper was generally discussed.

Mr. Alwood announced his intention of studying tobacco insects, and mentioned having observed a stem borer. Mr. Weed had heard of a root louse in southern Ohio.

Mr. Osborn read a paper on a peculiar Coleopterous larva infesting the stems of plants.

Mr. Garman spoke of the asymmetry of the mouth-parts of the *Thysanoptera*.

Mr. Weed read a paper on the oviposition of *Listronotus latiusculus* on the stalks of *Sagittaria variabilis*, which was discussed by Messrs. Garman, Fletcher and Webster.

Mr. Robertson made some remarks upon the habits of *Emphor bombyliformis*, an apparently special visitor of *Hibiscus*. The subject elicited general discussion.

Miss Murtfeldt read a paper entitled, "Some experiences in rearing Insects." The paper was commented upon by Messrs. Fletcher, Webster and Osborn.

After general discussion it was "*Resolved*, that it is the sense of the Club that the meetings of the Association of Economic Entomologists and of the Entomological Club would both be benefitted by holding such meetings if possible, at the same time and place as the meeting of the American Association for the Advancement of Science."

The Secretary read a paper by Dr. Kellicott, of Columbus, O., upon "The preparatory stages of *Eustrotia caduca*," which was generally discussed.

Mr. Cook mentioned finding the eggs and rearing the larva of *Agrotis C-nigrum* on currant. Mr. Osborn read a paper on the period of incubation of Mallophaga. Mr. Earle presented some notes on injurious insects of southern Mississippi.

August 22d.—Mr. Weed presented a paper on the habits of *Lixus concavus*. Mr. Hargitt called attention to early observations on the canker worm, to a species of *Cecidomyia* infesting the tops of *Solidago*, and presented some "Notes upon *Cermatia forceps*." The latter was discussed by Messrs. Fletcher and Webster.

Officers were elected as follows: *President*, Herbert Osborn; *Vice-President*, Miss Mary E. Murtfeldt; *Secretary*, Clarence M. Weed.

Mr. Osborn presented a paper on "The uses of contagious diseases in destroying injurious insects," which was discussed by Messrs. Fletcher, Hargitt, Cook and Garman.

Mr. Atkinson spoke of a number of injurious Alabama insects, and of the species mentioned by him, *Thrips* and *Scolytus rugulosus* were further commented on by Messrs. Webster and Fletcher.

Mr. Weed read a paper on the oviposition of *Dectes spinosus* in *Ambrosia trifida*. Mr. Webster had usually found it about *A. artemisiæfolia*.

Mr. Cook presented some notes on the insects of the year, and Mr. Weed presented a paper on *Psephenus lecontei*, taken on the shores of Lake Erie.

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 160, vol. vi.)

LEPTURA Serville.

The species of *Leptura* were arranged in synoptic form by Dr. LeConte in 1873. Since that time a few changes have been noted by Dr. Horn in various publications, and the result appears in the "Check List" of Mr. Henshaw. A few more remain to be noted as follows:

cyanella Lec. is undescribed, and = **chalybæa** Hald.
zebra Oliv. should be **nitens** Forst, on account of priority.
quadrata Lec. is a form of **instabilis** Hald.
canadensis Fab. should read **canadensis** Oliv.
ebena is a name proposed for a totally black form of **canadensis.**
crassicornis Lec. is the female of **crassipes** Lec.
vittata Germ. should read **vittata** Oliv.
spuria Lec. = **Acmæops militaris** Lec. *fide* Dr. Horn.
vexatrix Mann., formerly placed as a synonym of **sexmaculata** Linn., appears to be a distinct species.

For the last two corrections I am indebted to Dr. Horn as well as for many minor suggestions not specially acknowledged in the notes which follow the synopsis, and in preparing the lists of localities for the various species I have enjoyed the use of Dr. Horn's collection and the valuable assistance of Mr. Henshaw.

The following synopsis closely follows that of Dr. LeConte and incorporates all the changes that I have been able to discover. The descriptions of varieties in coloring are stated in the notes at the end.

Synopsis.

A.—Prothorax more or less triangular, or campanulate, widest at the base, hind angles prolonged . . . . **STENURA** Serv.

B.—Prothorax more or less triangular, or campanulate, widest at the base, hind angles not prolonged; antennæ with 4½ joints punctured, the remainder sericeous . . . . . . **LEPTURA** restrict. Serv.

C.—Prothorax constricted before and behind (except in a); hind angles not prolonged; last joint of palpi dilated, triangular, truncate, sometimes obliquely, sometimes transversely, hind angles of head obtuse and rounded, never square; elytra scarcely narrowed behind . . . . (**vittata,** etc.)

D.—Prothorax constricted before and behind, hind angles scarcely prolonged, but broadly and feebly lobed; elytra parallel, truncate at tip, and armed with a strong sutural spine; not dilated, penultimate joint of maxillary nearly as long as last joint; hind angles of head short, rounded, genæ moderate, mouth rather short, front with a deep transverse impression; antennæ slender, with 4¾ joints punctured, remainder sericeous; 11th joint not appendiculate; ♂ with antennæ longer, and 5th ventral broadly and deeply emarginate with angles acute . . . . . . (**valida** only)

E.—Prothorax quadrate, slightly narrowed in front, not constricted, but only feebly impressed behind, elytra feebly narrowed from the base, slightly truncate at tip; palpi as in B, with the last joint feebly dilated, truncate, and longer than the preceding; head suddenly narrowed behind, but not constricted, very short hind angles, rounded; antennæ with 4½ joints punctured, the remainder sericeous, 11th joint ♂ very strongly appendiculate, 7th and following with a smooth, feebly carinated line beneath. (**mutabilis,** etc.)

F.—Prothorax constricted before and behind, wider at base, hind angles not prolonged; elytra wider, parallel, rounded at tip; head suddenly narrowed far behind the eyes, but not constricted; hind angles, therefore, long, broadly rounded; *eyes not* emarginate; antennæ inserted a little behind the front margin of the eyes, slender, with 4½ joints punctured, remainder sericeous, 11th joint simple; genæ rather short, palpi with the last joint triangular, truncate, as in *vittata*. This group differs from *Acmæops*, chiefly by the position of the antennæ . . . . (**cubitalis** only)

A a.—Prothorax strongly narrowed from the base, which is broadly but deeply bisinuate, posterior transverse impression distinct; elytra widest at the base, gradually narrowed behind, truncate and emarginate at tip which is not margined . (**emarginata** to **rubida**)

A b.—Prothorax nearly smooth, strongly and gradually narrowed from the base, which is bisinuate, hind impression very deep; elytra very coarsely punctured, not narrowed, very dehiscent, rounded, subacuminate and distinctly margined at tip . (**cruentata** only)

A c.—Prothorax punctured, without hind impression, campanulate, but subquadrate, hind angles small (except *americana*); elytra parallel, genæ very short . . . . (**chalybæa, hæmatites,** etc.)

A d.—Prothorax transversely depressed at the base, convex, much rounded on the sides before the middle, hind angle small (except in *impura*); elytra at base wider than prothorax, more or less narrowed behind, usually black, spotted or banded with yellow; genæ moderately long (shorter in last two) . . (**læta, cordifera,** etc.)

A e.—Prothorax longer than wide, subcampanulate, with a deep transverse impression near the base, hind angles broad, laminate; color black, elytra sometimes testaceous, scarcely narrowed behind; antennæ with 4th joint very short . . . . (**brevicornis,** etc.)

A a.

Antennæ feebly serrate; 5th ventral ♂ flattened, broadly truncate-emarginate and bidentate; mouth short, hind angles of head more prominent.
Black, velvety pubescent; elytra red, with apex black.
Elytra not sulcate, prothorax sparsely punctured . . . . **emarginata.**
Elytra sulcate; prothorax densely punctured . . . . **gigas.**

Antennæ filiform; 5th ventral ♂ broadly truncate-emarginate and bidentate; mouth long, hind angles of head less prominent.

Prothorax densely not finely punctured.

Elytra yellow, with anterior blotch (frequently wanting), medial band and apex black; legs varied black and yellow; sides and base of prothorax sometimes yellow; antennæ usually annulated.

Antennæ long and slender . . . . **obliterata.**

Antennæ stouter; elytra with middle and posterior band black. **soror.**

Elytra yellow, more obliquely truncate at tip, lateral spot near the middle, suture behind and apex black; legs, antennæ and body black . . . . **propinqua.**

Elytra yellow, with vague medial and posterior bands interrupted at the suture, sides of prothorax, abdomen and legs testaceous; tarsi, tip of posterior tibiæ and hind femora fuscous; narrower than *obliterata*, with the ♂ antennæ longer and 11th joint very distinctly appendiculate, and prothorax more sinuate on the sides. **deleta.**

Prothorax more finely punctured.

Black, elytra luteo-testaceous or black, tip blackish; 3d, 4th and base of 5th ventral segments red . . . . **plebeja.**

More slender, antennæ annulate with yellow; ♂ black, base of legs yellow; elytra with base of epipleuræ yellow and a broad vitta; ♀ testaceous, disc of thorax, scutellum, suture, side margin, transverse spot at middle and tip of elytra black; legs varied with black . . . . **subhamata.**

Prothorax strongly less densely punctured.

Much broader and stouter, hind impression of prothorax very deep; abdomen red, base and tip blackish; ♂ black; ♀ yellow, occiput, two prothoracic spots, knees, tips of tibiæ and tarsi black; elytra black, with side margin and oblique vitta yellow; varies with trunk fuscous, and prothorax with the disc black . **abdominalis.**

Broad, black, prothorax deeply impressed behind, elytra ♀ sanguineous, with a very broad, common, discoidal stripe not reaching the base; abdomen sanguineous; ♂ black . . . . . . **plagifera.**

Smaller, black, prothorax less deeply imqressed; elytra with a spot near the tip yellow . . . . **amabilis.**

Prothorax densely punctured, feebly impressed; form slender.

Prothorax not sinuate on the sides, fuscous, finely pubescent; elytra testaceous; suture, dorsal vitta and submarginal spots blackish; legs testaceous, antennæ annulate . . . . **lineola.**

Black, clothed with short yellow pubescence, elytra dark testaceous, coarsely punctured, tip sometimes black . . . . . . **rubida.**

A b.

Black, sides of elytra, metathorax and abdomen red; thighs red, with the tip black . . . . **cruentata.**

A c.

Elytra rounded and margined at tip.

Black; elytra blue, polished, coarsely and sparsely punctured, antennæ and legs either black or yellow . . . . **chalybæa.**

Black; head and prothorax light rufous.

Elytra shining, very coarsely punctured, tip subtruncate; prothorax without impressions . . . . **capitata.**

Elytra densely, not coarsely punctured, tip rounded; prothorax impressed near the hind angles . . . . **americana.**

Black, hoary with fine white pubescence, prothorax dull red . **hæmatites.**

Black, with white pubescence; head, prothorax, legs and scape of antennæ more or less yellow . . . . **exigua.**

Elytra scarcely or not margined at tip.

Dull black, hoary with fine white pubescence; head, legs and scape of antennæ sometimes ferruginous, or partly so . . . **subargentata.**

Dark blue, elytra with red humeral spot, sometimes wanting . **molybdica.**

A d.

Prothorax transversely excavated along the whole base, sides sinuate, tip strongly tubular; body beneath, margins of prothorax and elytral bands golden pubescent; tip truncate, legs ferruginous.

Yellow bands broader at the suture.

Antennæ very stout, dark ferruginous . . . . **læta.**

Antennæ more slender, nearly black (*zebra*) . . . . **nitens.**

Bands equal, straight . . . . **tribalteata.**

Prothorax feebly excavated each side near the hind angles; pubescence not golden.

Brownish yellow, densely clothed with fine pubescence, hind angles of prothorax more explanate and prolonged; elytra with a faint lateral fuscous spot at the middle; tip truncate . . . . **impura.**

Prothorax narrowed from the base, sides subsinuate; elytra yellow, with two marginal spots and tip black, the latter dehiscent, not truncate; often has in addition a black common spot on the suture, sometimes narrowly connected with black tip . . . . **cordifera.**

Prothorax not narrowed from the base, sides sinuate, rounded in front; elytra with yellow bands or spots, variously confluent, sometimes entirely black, suture dehiscent, tip rounded . **instabilis.**

Prothorax not wider than long, more finely and densely punctured, body less robust; elytra less dehiscent at tip, which is more broadly rounded and scarcely margined; yellow, with base, two bands and apex black, bands sometimes interrupted . **sexmaculata.**

Prothorax more rounded in front; elytra depressed on disc, truncate and emarginate at tip; yellow, with two blotches, humeral and medial, and tip black . . . . **vexatrix.**

Legs and antennæ ferruginous; elytra feebly dehiscent, tips broader and nearly rounded, distinctly margined; elytra yellow, entire margin black, a discoidal spot near the base, large lateral one near the middle, and transverse one near tip black. **sexspilota.**

Prothorax broader than long, campanulate, transversely excavated or depressed along the whole base, sinuate on the sides, tip strongly constricted and tubular; pubescence not golden; elytra rounded and margined at tip; mouth and genæ rather stout.

Elytra testaceous, with a large blotch behind the middle, extending to the margin, but not the suture, and tip black; markings sometimes faint . . . . **matthewsii.**

Entirely black, more coarsely punctured . . . . **grossa.**

A e.

Prothorax coarsely, elytra very coarsely punctured, truncate and spinose; antennæ ♀ short, thickened externally . . . . . **brevicornis.**

Prothorax densely and coarsely punctured; antennæ slender; elytra sharply truncate at tip . . . . **nigrella.**

Prothorax sparsely punctured; antennæ slender; elytra feebly truncate at tip. **carbonata.**

B.

B a.—Antennæ annulated with yellow, 11th joint distinctly divided; elytra narrowed from the base, tip truncate and dentate; ♂ antennæ serrate, and 5th ventral flattened triangularly, emarginate and bidentate . . . . (**canadensis** to **circumdata**)

B b.—Antennæ annulated or nearly black, subserrate in ♂; with the 11th joint feebly appendiculate; elytra narrowed from the base, very dehiscent at tip, which is nearly rounded and indistinctly margined; form short and very stout . . (**vagans** and **dehiscens**)

B c.—Antennæ not annulated, 11th joint scarcely appendiculate; elytra slightly narrowed from the base, sharply truncate at tip; prothorax scarcely constricted behind . . (**sanguinea** to **dolorosa**)

B d.—Antennæ not annulated, 11th joint scarcely appendiculate; elytra slightly narrowed from the base ♂, almost parallel ♀, elevated at the base, elongate, scarcely truncate, not densely, but very finely pubescent; yellow with black spots or bands; prothorax bell shaped, transversely depressed at base, which is more deeply sinuate than usual . . . . . (**crassipes** to **octonotata**)

B e.—Antennæ annulated, 11th joint not appendiculate; elytra parallel, elongate, not elevated at base, truncate at tip; prothorax bell shaped, constricted strongly at tip, and less strongly at base; hind angles of head obtuse, genæ moderate, front with a transverse impression . . . . (**pedalis**)

B a.

Elytra ♂ and ♀ truncate-emarginate at tip; prothorax more deeply constricted behind; antennæ strongly appendiculate, ♂ strongly serrate almost entirely black, ♀ feebly serrate, joints 4–11 annulate with yellow; black, elytra more or less red. **canadensis.**

Elytra truncate at tip, ♂ sometimes feebly emarginate; prothorax feebly constricted behind.

Elytra entirely red; antennæ ♂ and ♀ with joints 1–5 black, 11th joint feebly appendiculate; ♂ antennæ serrate, abdomen red, ♀ antennæ nearly filiform, abdomen black . . . . **rubrica.**

Elytra pale, side margin and tip black; small species . . . **circumdata.**

B b.

Antennal joints 6–11 annulate with yellow; elytra very coarsely punctured, more or less testaceous or red, sometimes entirely black; ♂ with 5th ventral deeply excavated and emarginate . . **vagans.**

Antennæ entirely black; elytra less coarsely punctured, testaceous; ♂ with 5th ventral less excavated and emarginate . . . . **dehiscens.**

B c.

Prothorax densely and coarsely punctured; 5th ventral ♂ flattened and truncate.

Elytra reddish, testaceous, fuscous towards tip, which is transversely truncate . . . . **sanguinea.**

Elytra obliquely truncate; ♂ entirely black, or partly testaceous, ♀ elytra scarlet, with a subsutural spot before the middle, one near the side at the middle, and the tip black . . . . **lætifica.**

Elytra testaceous, feebly truncate, apex and subapical band black; pubescence very long . . . . **hirtella.**

Prothorax less densely punctured; 5th ventral ♂ flattened and broadly rounded.

Elytra obliquely truncate and subdentate at tip; black, with yellow markings, viz.: a subscutellar spot and two transverse bands, connected at the suture, more or less interrupted, and even reduced to two smaller spots . . . . **quadrillum.**

Prothorax coarsely punctured; elytra densely pubescent with golden hair arranged transversely; 5th ventral ♂ scarcely impressed; elytra transversely truncate, frequently fuscous at the sides. **chrysocoma.**

Prothorax usually densely and coarsely punctured, transversely impressed and constricted behind, disc more or less channeled; 5th ventral ♂ scarcely impressed; pubescence of the elytra short and sparse.

First joint of middle tarsi as long as the two following; prothorax feebly impressed.

Pubescence of prothorax golden; elytra testaceous, suture and lateral vitta extending to tip black . . . . **nigrolineata.**

Black, pubescence brown; elytra and legs testaceous, prothorax subangulated on the sides, elytra more coarsely punctured . **rufula.**

First joint of middle tarsi scarcely longer than the second; sides of elytra more sinuate.

Elytra testaceous, tip black, or entirely black . . . . **proxima.**

First joint of the middle tarsi as long as the two following; prothorax sparsely punctured, more deeply channeled and impressed; hind angles of head more tumid and nearly square; elytra elevated at base.

Fusco-testaceous, elytra paler, with a medial marginal dark spot; antennæ ♂ very long . . . . **biforis.**

Black, antennæ ♂ moderate . . . . **dolorosa.**

B d.

Hind angles of head square, genæ rather long; ♂ with 5th ventral impressed, truncate and emarginate.

Prothorax obtusely angulated or strongly sinuate on the sides; legs entirely yellow; ♂ elytra yellow, apex black (sometimes enclosing yellow spot) and two incomplete bands black; antennæ more slender, fuscous or black; ♀ elytra yellow, with apex and three bands (sometimes incomplete) black; antennæ very stout, yellow. **crassipes.**

Prothorax rather rounded than sinuate on the sides; thighs and tips of tibiæ dark; abdomen black . . . . **tibialis.**

Hind angles short, tumid, but obtuse, neck less constricted; prothorax less sinuate on the sides, more finely and less densely punctured; pubescence white, long and fine.

Black, elytra with a basal spot, two bands connected near the suture, and a large spot near the tip yellow; legs and abdomen ferruginous, tarsi dusky . . . . **behrensii.**

Hind angles of head very short, rounded; ♂ as above.

Blackish blue, shining, prothorax feebly rounded on the sides; elytra slightly truncate at tip, with four pale yellow spots on each; base of thighs pale . . . . **octonotata.**

B e.

Black, with fine, sparse, yellowish pubescence; head and prothorax finely, very densely punctured; elytra twice as wide as prothorax, punctured, more densely and a little more finely towards the tip; antennæ long and slender, annulate with pale, legs ferruginous or fuscous . . . . **pedalis.**

C.

C a.—Elytra protuberant at base; tip subtruncate, suture with a small spine; prothorax scarcely constricted, more deeply bisinuate at base.

C b.—Elytra not protuberant at base, rounded at tip; prothorax very deeply constricted before and behind, sides strongly rounded and disc very convex; head prolonged behind eyes.

C c.—Elytra not protuberant at base, rounded at tip; prothorax slightly constricted at base and at tip, sides tuberculate; head prolonged behind the eyes; antennæ stout, third and fourth joints united, equal to fifth.

C a.

Head prolonged behind the eyes; sparsely punctured, black, shining; elytra with a yellow vitta, sometimes wanting, or entirely testaceous. **vittata.**

Neck very near to the eyes; black, prothorax pubescent, with erect hair, densely punctured with a smooth dorsal vitta . . . **pubera.**

C b.

Black, front legs, base of thighs and tibiæ, more or less yellow; prothorax sometimes red (*ruficollis* Say), very finely pubescent, nearly smooth; base punctured . . . . **sphæricollis.**

Black, front legs, base of thighs and tibiæ, more or less yellow; prothorax sparsely, finely punctured, base punctured; elytra more coarsely punctured, with a yellow vitta extending from base almost to tip, sometimes interrupted near the tip . . . . **vibex.**

Testaceous, prothorax densely punctured, clothed with yellow pubescence; elytra more coarsely punctured, with a sutural and lateral black vitta, extending nearly to the tip . . . . **aurata.**

Piceous or black, prothorax scarcely punctured, feebly pubescent; elytra less coarsely punctured, with three marginal spots and a sinuate black vitta extending from base for three-fourths the length, where it is confluent with the posterior spot, or vitta reduced to a very short basal streak and marginal spots to faint clouds; legs testaceous, hind thighs dusky at tip . . . . **scripta.**

C c.

Testaceous, elytra very coarsely punctured, with a small fuscous spot near the side about the middle . . . . **gnathoides.**

D.

Testaceous, finely pubescent; elytra with narrow sutural line, two small clouds near the base, and two about the middle fuscous (very large species) . . . . **valida.**

E.

Elytra punctured.

Black, prothorax slightly, but distinctly narrowed in front, pubescence short; elytra black or testaceous . . . . **mutabilis.**

Black, prothorax nearly square, pubescence long, erect, fuzzy (one specimen only known) . . . . **quadricollis.**

Elytra rough, with elevated points or granules.

Very black, thorax feebly bisinuate on the sides; antennæ not carinated, 11th joint not appendiculate . . . . **aspera.**

F.

Black, antennæ brown, front legs ferruginous, with knees, tip of tibiæ and tarsi dark; head and prothorax longer than wide, densely and finely punctured, the latter subcanaliculate, with smooth, narrow, dorsal space (looks like *Acmæops*) . . . . **cubitalis.**

Bibliography and Notes.

L. emarginata Fab., 1775, Ent. Syst. i, 2, p. 341; Oliv., Ent. iv, 73, p. 5, t. 3, fig. 26; Hald., Trans. Am. Phil. x, p. 62.

Length 30 mm. = 1.20 inch. *Hab.*—Pa., N. C., N. Y., Texas.

L. gigas Lec., 1873, S. M. C. No. 264, p. 223.

Length 30—35 mm. = 1.20—1.40 inch. *Hab.*—Texas, N. Mex.

These two are easily known by the large size and red elytra, sulcate in *gigas*, not in *emarginata*.

L. obliterata Hald., 1847, l. c.; *perductor* Walker, Nat. Hist. Vanc. 1866, ii, p. 333; *vitiosa* Lec., Proc. Ac. Phil. vii, 1854, p. 18; Ent. Rep. 1857, p. 64.
Length 15—18 mm. = .60—.72 inch. *Hab.*—Vanc., Wash., Oreg., Cal., Nev., Mont., Id.

Varies in the extent of the black markings, and LeConte's name *vitiosa* is applied by some to the specimens with elytral tip black, reserving *obliterata* for the lighter specimens without black tip.

L. soror Lec., 1873, S. M. C. No. 264, p. 223.
Length 12 mm. = .48 inch. *Hab.*—Cal., Vanc.

Very close to the preceding, but the elytra lack the ante-medial spot and the antennæ are stouter, the fourth joint more distinctly shorter than the fifth than in *obliterata*.

L. propinqua Bland, 1865, Proc. Ent. Soc. Phil. p. 384.
Length 12—16 mm. = .48—.64 inch. *Hab.*—Col., Nev., N. Mex., Ariz., Or., Wash., Id., Mont., Can. W.

L. deleta Lec., 1853, J. A. P. ser. 2, ii, p. 328.
Length 12 mm. = .48 inch. *Hab.*—Mass.

L. plebeja Rand., 1838, Bost. Jour. ii, p. 28; Lec., l. c. p. 333.
Length 13 mm. = .52 inch. *Hab.*—Can., Mich., N. J., N. C., N. H., L. Superior, Maine.

These seem to be rare in collections, and I have been unable to procure specimens of *deleta* and *plebeja*. The descriptions in table will serve to identify them. The general form is similar to the neighboring species.

L. subhamata Rand., 1838, Bost. Journ. ii, p. 28; Hald., l. c. p. 61; *armata* Hald., l. c. p. 61; *interrupta* Newn., Ent. 1841, p. 72; *lecontei* Dej. Cat.; *elegans* Lec., l. c. p. 329; Hald., l. c. p. 63.
Length 12—15 mm. = .48—.60 inch. *Hab.*—Can., N. H., Mich., N. J., N. Y.. Pa., Va., N. C., Ill., Mass.

An abundant and variable species, ♂ and ♀ differing in color, the ♀ being much the blacker. The normal marking of thorax is black with yellow sides ♀, yellow preponderating ♂, or reducing the black color to a discal line in the form *elegans* Lec. The elytra are normally black with a yellow vitta interrupted at middle and not reaching tip ♀, or yellow color exceeding black ♂, or reducing the black to a short, transverse, medial spot, form *elegans* Lec. The black color also disappears almost entirely from the legs in this extreme form.

L. abdominalis Hald., 1847, l. c. p. 63, ♂; *atrovittata* Bland, 1864, Proc. Ent. Soc. p. 255 ♀.
Length 15 mm. = .60 inch. *Hab.*—N. J., Ga., So. La., Texas.

A conspicuously stout species, the sexes differing in color and described under different names.

L. plagifera Lec., 1873, S. M. C. No. 264, p. 224 ♀. *anthracina* Lec., 1875, Trans. Am. Ent. Soc. v, p. 174 ♂.
Length 13 mm. = .52 inch. *Hab.*—Nev., Col., Cal., Mont. Id., Or.

L. amabilis Lec., 1857, Ent. Rep. p. 64.
Length 7.5 mm. = .30 inch. *Hab.*—Or., Wash.

This species seems to be rare, and is in few collections.

L. lineola Say, 1823, J. A. P. iii, p. 421; Lec., J. A. P. ser. 2, i, p. 330; Dej. Cat. 3 ed. p. 362; *indirecta* Newn. Ent. 1841, p. 71; *cincta* Hald. Trans. Am. Phil. x, p. 63.
Length 8—13 mm. = 32—52 inch. *Hab.*—N. Y., Pa., Va., Texas, Md., Can., N. H., Mass., N. C., Miss., C. W.

L. rubida Lec., 1873, S. M. C. No. 264, p. 224.
Length 13 mm. = .52 inch. *Hab.*—Cal.

This species also seems rare. Dr. LeConte's description says "general form is the same as *subargentata*."

L. cruentata Hald., 1847, l. c. p. 64.
Length 9 mm. = .36 inch. *Hab.*—Pa., Ga., Texas, Can. W.

L. chalybæa Hald., 1847, l. c. p. 60; Lec., J. A. P. ser. 2, i, p. 331; *cyanella* Lec. (undescribed)
Length 6 mm.; .24 inch. *Hab.*—Can., N. Y., Pa., N. C., O., Ia.

L. capitata Newn., Ent. 1841, p. 71; Hald., l. c. p. 65; *sanguinicollis* Dej. Cat.
Length 6.5—9 mm.; .26—.36 inch. *Hab.*—Can., N. H., Pa., Mich., Ia., Ohio, Ga., N. Y., Mo., Mass.

L. americana Hald., 1847, l. c. p. 63; Lec., J. A. P. ser. 2, i, p. 331; *fuscicollis* Dej. Cat.
Length 8—9 mm.; .32—.36 inch. *Hab.*—Ohio, Ind. T., Ga., Pa.

The hind angles of prothorax are very prominent in this species, which otherwise greatly resembles the preceding.

L. hæmatites Newn., Ent. 1841. p. 73.
Length 4—6 mm.; .16—.24 inch. *Hab.*—Mass., Ct., N. Y., N. C., N. Ill.

Very abundant near New York on the blossoms of *Cornus*.

L. exigua Newn., 1841, Ent. p. 73; *nana* Newn. l. c.; *saucia* Lec., Proc. Ac. Phil. 1862, p. 40.
Length 5.5—7 mm.; .22—.28 inch. *Hab.*—Can., Mass., N. Y., Pa., N. Ill.

The species is found to vary considerably in color. See note by Dr. Horn, vol. i, p. 8. "The typical form is black, the basal joint of antennæ and front legs pale; *nana* has mouth, front legs, and bases of middle and hind femora pale; *saucia* has legs similar to *nana*, the thorax yellow, with a large discoidal black spot; sometimes the angles only yellow."

L. subargentata Kirby, 1837, Fn. Bor. Am. iv, p. 184; Mann., Bull. Mosc. 1853, iii, p. 251; *ruficeps* Lec., Proc. Ac. Phil. 1862, p. 40; *similis* Ky., l. c., p. 185; Lec., J. A. P. ser. 2, p. 331; *rufibasis* Lec., Proc. Ac. Phil. 1862, p. 40; *rhodopus* Lec., Trans. Am. Ent. Soc. 1874, p. 68.

Length 6—7.5 mm.; .24—.30 inch. *Hab.*—Alaska, Vanc., H. B. T., L. Sup., N. H., N. Y., Ga., Mich., Col., N. Mex., Nev., Cal., Wash., Can. W., Can. E., Mont., Mass.

This is another very variable species in color. The typical form is entirely black, hoary with fine white pubescence.

Form *ruficeps:* head dull ferruginous; front legs and base of middle thighs testaceous.

Form *similis:* scape, front legs, base of middle and part of hind tibiæ ferruginous.

Form *rufibasis:* scape and legs ferruginous.

Form *rhodopus:* entirely black.

L. molybdica Lec., 1850, J. A. P. ser. 2, i, p. 101; *militaris* Chev., Rev. Zool. 1855, p. 187; Ann. Fr. 1858, p. 529, t. 12, fig. 3.

Length 5—6 mm.; .20—.24 inch. *Hab.*—Cal., Rocky Mts., Nev., Or.

Chevrolat's name *militaris* is usually applied to the form with red humeral angles.

L. læta Lec., 1857, Ent. Rep. p. 64.

Length 12.5 mm.; .50 inch. *Hab.*—Wash., Or., Cal., Nev., Vanc.

L. nitens Forst., 1771, Nov. Spec. Ins. p. 45; *zebra* Oliv., 1795, Ent. iv, 73, p. 19, t. 3, fig. 33; Hald., 1849, Trans. Am. Phil. x, p. 62; *carolina* Web., 1801, Obs. Ent. 1, p. 91; *quagga* Germ., 1824, Ins. Lep. nov. p. 521.

Length 10—13 mm.; .40—.52 inch. *Hab.*—Massachusetts, New York, Pennsylvania, North Carolina, Illinois, Texas, New Jersey, Iowa, Georgia, Canada West.

Forster's name has priority, and should be restored. The confusion caused by the strong resemblance to *Typocerus zebratus* is noted in the remarks under that species, and it is well to have the names more distinctive.

L. tribalteata Lec., 1873, S. M. C. No. 264, p. 224.

Length 7—10 mm.; .28—.40 inch. *Hab.*—Nevada, California, Idaho.

L. impura Lec., 1857, Ent. Rep. p. 64.

Length 9 mm.; .36 inch. *Hab.*—Nevada, Oregon, California.

L. cordifera Oliv., 1795, Ent. iv, p. 25, t. 4, fig. 41; Lec., J. A. P. ser. 2, i, p. 332; *abdominalis* Dej. Cat. 3 ed.; *rosarum* Lec., l. c.; *lunaris* Hald., Trans. Am. Phil. x, p. 59.
Length 10—13 mm.; .40—.52 inch. *Hab.*—New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Virginia, North Carolina, Georgia, Michigan, Maryland, Lake Superior.

L. instabilis Hald., 1847, Trans. Am. Phil. x, p. 59; Lec., J. A. P. ser. 2, i, p. 332; *convexa* Lec., l. c.; *quadrata* Lec., S. M. C. No. 264, p. 225.
Length 7—13 mm.; .28—.52 inch. *Hab.*—New Hampshire, Montana, Idaho, Wyoming, Oregon, Washington, California, Nevada, Colorado, Kansas, New Mexico, Saskatchewan.

This species and the preceding are continually confused in collections; the differences and variations in color are pointed out in the synoptic table. It will be noted that *cordifera* is an eastern species, and *instabilis* a western, though the localities overlap somewhat. The specimens in collections are usually banded and labeled *convexa*, and the name *instabilis* retained for those with the bands broken into spots. I propose to extend the name *quadrata* Lec. to the form which is entirely black, it having been originally applied to a specimen nearly black, with antennæ and legs ferruginous.

L. sexmaculata Linn., Syst. Nat. ed. x, p. 398; Oliv.. Ent. iv, 73, p. 26; Kby., 1837, Fn. Bor. Am. iv, p. 182.
Length 9.5 mm.; .38 inch. *Hab.*—Colorado, Michigan, New Hampshire, Vancouver, Lake Superior, Canada.

This insect is common to our northern latitudes and those of Europe.

L. vexatrix Mann., 1853, Bull. Mosc. iii, p. 250.
Length 10.5 mm.; .42 inch. *Hab.*—Kenai, California. Nevada, Oregon.

This species has been confused with the preceding form, which it differs by the characters of the table.

L. sexspilota Lec., 1859, Proc. Ac. Phil. p. 80.
Length 9 mm.; .36 inch. *Hab.*—California.

L. matthewsii Lec., 1869, Ann. Nat. Hist. iv, p. 384.
Length 14 mm.; .56 inch. *Hab.*—Vancouver, Washington, California.

L. grossa Lec., 1875, S. M. C. No. 264, p. 225.
Length 18 mm.; .72 inch. *Hab.*—California.

L. brevicornis Lec., l. c.
Length 18—19 mm.; .62—.76 inch. *Hab.*—Washington, Nevada.

L. nigrella Say, 1827, J. A. P. v, 2, p. 279; *nigrita* Dej. Cat. 3 ed.
Length 10—15 mm.; .40—.60 inch. *Hab.*—Hudson's Bay, Michigan, Washington, Nevada, Colorado, New Mexico, Canada, Lake Superior, Georgia, Maine.

L. carbonata Lec., 1861, Proc. Ac. Phil. p. 355.
Length 9.5 mm.; .38 inch. *Hab.*—Washington, California.

L. canadensis Oliv., 1795, Ent. iv, 73, p. 8, t. 3, fig. 27; Fab., 1801, Syst. El. ii, p. 357; Kirby, Fn. Bor. Am. iv, p. 181; *tenuicornis* ♂ Hald., Trans. Am. Phil. x, p. 64; *erythroptera* Kirby; l. c. p. 180; *cinnamoptera* Hald., l. c. p. 64; *cribripennis* Lec., Col., Kansas, 1859, p. 21.
Length 12—18 mm.; .48—.76 inch. *Hab.*—Canada, Nova Scotia, New Hampshire, Michigan, New York, Pennsylvania, Virginia, Kansas, Colorado, Idaho, Vancouver, Massachusetts, Louisiana, Missouri, Canada West, Georgia, Lake Superior, New Mexico, Nebraska, Oregon.

Olivier's description antedates that of Fabricius. The specimens vary a great deal in color and in punctuation. The name *cribripennis* Lec. is applied to very coarsely punctate, shining specimens; *erythroptera* Ky., to specimens with entirely red elytra, not shining; *canadensis* Oliv., to specimens with elytra bicolored, not shining; *ebena* is proposed for specimens with elytra entirely black.

L. rubrica Say, 1823, J. A. P. iii, p. 418; Hald., Proc. Ac. Phil. iv, p. 374; *annulata* Dej. Cat. 3, ed.; *erythroptera* Germ., Spec. Ins. nov. p. 522; Hald., Trans. Am. Phil. x, p. 64.
Length 10—16 mm.; .40—.64 inch. *Hab.*—Massachusetts, New York, New Jersey, Virginia, Georgia, N. Illinois, Michigan, Nebraska, Pennsylvania, Colorado, Kansas. ✓

L. circumdata Oliv., 1795, Ent. 73, p. 32, t. 4, fig. 48; Hald., l. c. p. 65.
Length 7—8 mm.; .28—.32 inch. *Hab.*—Massachusetts, New York, Pennsylvania.

L. vagans Oliv., 1795, l. c. p. 31; Lec., J. A. P. ser. 2, i, p. 337; *axillaris* Dej. Cat. 3 ed.; *brevis* Kby., Fn. Bor. Am. iv, p. 182.
Length 9—12 mm.; .36—.48 inch. *Hab.*—New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Virginia, North Carolina, Georgia, Michigan, Maine, Canada, Canada West.

L. dehiscens Lec., Proc. Ac. Phil. 1859, p. 89.
Length 10—11.5 mm.; .40—.46 inch. *Hab.*—Washington, California, Oregon, Vancouver.

L. sanguinea Lec., l. c.
Length 10 mm.; .40 inch. *Hab.*—Vancouver, Washington, California, Colorado, N. Mexico, Nevada, Michigan, N. Hampshire, Oregon.

L. lætifica Lec., l. c.; *lugens* Lec., l. c.
Length 8—12 mm.; .32—.48 inch. *Hab.*—Nevada, Washington, California, Oregon.

L. hirtella Lec., 1873, S. M. C. No. 264, p. 226.
Length 10 mm., .40 inch. *Hab.*—Labrador, New Hampshire.

L. quadrillum Lec., Proc. Ac. Phil. 1859, p. 88.
Length 9—10 mm.; .36—.40 inch. *Hab.*—Vancouver, Washington, California, Oregon.

L. chrysocoma Kby., 1837, Fn., Bor. Am. iv, p. 179, t. 5, fig. 2; *auripilis* Lec., J. A. P. ser. 2, i, p. 339.
Length 12—14 mm.; .48—.56 inch. *Hab.*—Hudson's Bay, Canada, Nova Scotia, Michigan, Idaho, Vancouver, Colorado, Maine, Lake Superior, Utah, New York, Oregon, California, Nevada, N. Mexico.

L. nigrolineata Bland, 1865, Proc. Ent. Soc. Phil. iv, p. 383.
Length 7 lines; 14.5 mm.; .58 inch. *Hab.*—Colorado, Idaho.

L. rufula Hald., 1847, Trans. Am. Phil. x, p. 60.
Length 9.25 mm.; .37 inch. *Hab.*—Michigan, Lake Superior.

L. proxima Say, 1823, J. A. P. iii, p. 420; Hald., Trans. Am. Phil. x, p. 65; *subpubescens* Kby., Fn. Bor. Am. iv, p. 180; *terminata* Dej. Cat. 3 ed.; *atrata* Lec., J. A. P. ser. 2, i, p. 339; Dej. Cat. 3 ed.
Length 14 mm.; .56 inch. *Hab.*—Canada, New Hampshire, New York, Virginia, Georgia, Ohio, Michigan, Missouri, Illinois, Wisconsin, Massachusetts, Canada West, Pennsylvania.

The name *atrata* Lec. was applied to specimens entirely black.

L. biforis Newn., 1841, Ent. p. 70; Hald., Trans. Am. Phil. x, p. 64.
Length 12—13 mm.; .48—.52 inch. *Hab.*—Canada, Pennsylvania, Virginia, New York, Canada West.

This species resembles the entirely testaceous form of *L. vittata*, and thereby becomes mixed with it in collections.

L. dolorosa Lec., Proc. Ac. Phil. 1861, p. 355.
Length 13 mm.; .52 inch. *Hab.*—Vancouver, Washington, California, Nevada, Oregon.

L. crassipes Lec., Ent. Rep. 1857, p. 65; *crassicornis* ♀ Lec., S. M. C. No. 264, p. 227.
Length 10—13 mm.; .40—.52 inch. *Hab.*—Vancouver, Washington, Oregon, California, Nevada, Idaho.

A large series collected by Mr. H. F. Wickham in Idaho appeared to me to correspond with Dr. LeConte's description of *crassicornis* previously known by one specimen in Mr. Ulke's cabinet. Dr. Horn confirmed this opinion, but found the specimens to be all females, while the specimens of *crassipes* corresponding to the description were all males, whereby the synonymy above was established.

L. tibialis Lec., 1850, Agass. Lake Superior, p. 236.
Length 10—13 mm.; .40—.52 inch. *Hab.*—Lake Superior, Michigan, Washington, New Hampshire.

L. behrensii Lec., 1873, S. M. C. No. 264, p. 227.
Length 17 mm.; .68 inch. *Hab.*—California.

These two seem to be rather rare.

L. octonotata Say, J. A. P. iii, p. 419; Hald., l. c. p. 65; *stictica* Newn., Ent. p. 72; *4-punctata*, Hald., l. c. p. 64.
Length 10—20 mm.; .40—.48 inch. *Hab.*—Massachusetts, Pennsylvania, Virginia, Alabama, Mississippi, N. Illinois, New York, Wisconsin, Canada West.

L. pedalis Lec., Proc. Ac. Phil. 1861, p. 355.
Length 10 mm.; .40 inch. *Hab.*—New Hampshire, Lake Superior, Michigan, Anticosti.

L. vittata Oliv., Ency. Méth. vii, p. 523; Ent. iv, 73, p. 30, t. 4, fig. 45; *abbreviata* Germ., Ins. Spec. nov. p. 523; Zenk., Dej. Cat. 3 ed., 382; *limbata* Knoch., in litt.; *semivittata* Kb., Fn. Bor. Am. iv, p. 88.
Length 10–13 mm.; .40—.52 inch. *Hab.*—Canada, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Virginia, Georgia, Alabama, N. Illinois, Michigan, Louisiana, Maine, Wisconsin.

L. pubera Say, 1827, J. A. P. v, 2, p. 279.
Length 9—10 mm.; .36—.40 inch. *Hab.*—New Hampshire, Pennsylvania, Virginia, N. Illinois, Michigan, Massachusetts, Canada West, Lake Superior, Georgia, New York.

L. sphæricollis Say, 1827, J. A. P. v, 2, p. 280; *discicollis* Dej. Cat. 383; *allecta* Newn., Ent. 1841, p. 72; *ruficollis* Say, J. A. P. iii, 1823, p. 421; *collaris* Melsh., in litt.; *paupercula* Newn., Ent. p. 72.
Length 7–8 mm.; .28—.32 inch. *Hab.*—Canada, New Hampshire, Massachusetts, New York, Ohio, Kentucky, Michigan, Lake Superior, Pennsylvania, Canada West, Maine.

The name *sphæricollis* is later than *ruficollis*, but is preferred, as being descriptive of the species rather than a special form thereof, like *ruficollis*, which is retained for the form it suggests, viz.: that with red thorax.

L. vibex Newn., 1841, Ent. p. 72; *nitidicollis* Horn, Proc. Ac. Phil. 1860, p. 570, t. 8, fig. 5.
Length 6–10 mm.; .24—.40 inch. *Hab.*—Canada, New Hampshire, Connecticut, Pennsylvania, Ohio, Michigan, New York, West Virginia.

L. aurata Horn, 1860, l. c.
Length 9 mm.; .36 inch. *Hab.*—Pennsylvania, North Carolina, Virginia.

L. scripta Lec., 1869, Ann. Nat. Hist. iv, p. 384.
Length 6—9 mm.; .24—.36 inch. *Hab.*—Vancouver, Washington, Oregon, Nevada.

L. gnathoides Lec., 1873, S. M. C. No. 264, p. 228.
Length 9 mm.; .36 inch. *Hab.*—Washington, Oregon.

A rare and very peculiar species, resembling *Gnathium minimum* of the *Meloidæ*.

L. valida Lec., 1857, Ent. Rep. p. 64, t. 2, fig. 14.
Length 22 mm.; .88 inch. *Hab.*—California, Nevada, Oregon, Vancouver.

The largest of our *Leptura* after *gigas* and *emarginata*.

L. mutabilis Newn., 1841, Ent. p. 71; Lec., J. A. P. ser. 2, i, p. 340; *luridipennis* Hald., l. c. p. 63; Dej. Cat. 3 ed.
Length 8–13 mm.; .32—.52 inch. *Hab.*—New Hampshire, Massachusetts, New Jersey, New York, Pennsylvania, Michigan, Canada.

The species with testaceous elytra were called by Haldeman *luridipennis*, but a large series shows such gradations that it is inconvenient to attempt any separation.

L. quadricollis Lec., 1850, J. A. P. ser. 2, i, p. 339.
Length 8–9 mm.; .32—.36 inch. *Hab.*—Massachusetts, Vermont.

Very rare, and doubtfully distinct from *mutabilis*.

L. aspera Lec., 1873, S. M. C. No. 264, p. 228.
Length 9—13 mm.; .36—.52 inch. *Hab.*—Canada, Michigan, Colorado, Idaho, Vancouver.

L. cubitalis Lec., 1861, Proc. Ac. Phil. p. 355.
Length 8 mm.; .32 inch. *Hab.*—California.

Association of Official Economic Entomologists.

The second annual meeting of the Association of Official Economic Entomologists will be held at the university buildings, Champaign, Ill., November 11th to 15th, proximo, at the same time as the meeting of the Association of Agricultural Colleges and Experiment Stations. The committee on Entomology of the latter association will meet at the same time.

Members expecting to attend will confer a favor upon the officers if they will announce the fact, and will send titles of papers to be read, or topics they desire discussed, to the secretary.

All are earnestly requested to be present if possible.

John B. Smith, *Secretary*.

A series of studies made upon the mouth parts of DIPTERA indicate a homology different from any previously accepted. Thus far I have examined a large number of families, and have succeeded in distinguishing all parts of the labium, including the palpi, and all parts of the maxilla. The labellæ and the operculum are modifications of the galea. The slides are all made, the drawings are in an advanced state of preparation, and the paper will be ready early in October if all goes well.—J. B. S.

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ENTOMOLOGICA AMERICANA

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THE BLACK PEACH APHIS.

A new species of the genus *Aphis*.

By ERWIN F. SMITH, Sc. D., Washington, D. C.

(Continued from p. 103, vol. vi.)

My attention was first called to this aphis in the Summer of 1887. Since then I have observed it repeatedly, my line of scientific inquiry having kept me in the peach orchards of the eastern United States almost continuously each year during the season of growth. I saw it first upon the roots of the peach and did not find any upon the parts above ground for more than a year.

This aphis is not restricted to any portion of the root system, but it prefers the smaller and younger fibres which admit of easy puncture. Upon these the insect congregates and multiplies. Sometimes the rootlets are entirely covered for an inch or two and completely sapped, the remoter portions becoming flabby and devitalized. Generally, however, I have found these root aphides in smaller colonies; sometimes it has required much digging to find any; and in a few instances I have failed altogether, when, from the appearance of the trees, I had every reason to suspect their presence. From these observations I conclude that they are more abundant at certain times of the year than at others. The character of the soil also appears to have some influence on their prevalence. They are most abundant and most destructive on light sandy lands, such as occur in southern New Jersey, and in the middle and southern parts of the Chesapeake and Delaware peninsula. I have, however, seen them on roots taken from the stiff clay a foot below the surface.

I saw them first in July, 1887. Since then I have found them on the roots in August, September, October, November, April and May. Experienced peach growers tell me that they have also seen them on the roots in December, January and February. Of their presence on the roots in mid-Winter, I think there can be no reasonable doubt. I believe it as firmly as anything I have not myself observed. During the last four years I have found them in seven counties on the Chesapeake and Delaware peninsula, and have also seen them on the roots of peach-trees in southwestern Michigan (1889). Altogether, I suppose I must have found them on the roots at least fifty times.

Upon the parts above ground I did not observe the insect until the fall of 1888, although I had looked for it repeatedly in many orchards. It should be stated, however, that my observations in this part of the United States were limited both years to mid-Summer and Autumn, while the forms above ground are most prevalent in the Spring. Even in 1888 I saw only two or three small colonies, and these were confined to one nursery. On the roots of the same trees, however, they were quite common at this time, and also during the next Summer.

In the mild Winter of 1888–89, colonies began to appear upon the branches of the peach long before any buds swelled. These colonies continued upon the branches and increased in number until some time in May. During that month they were in nearly every orchard which I visited. In many orchards they were prevalent enough to cause uneasiness, especially in the early part of the growing season when the leaf buds first opened. However, they did no serious injury, and in Autumn when I returned they were gone from the parts above ground, but were plentiful on the roots.

The Winter of 1889–90 was milder than the preceding one. In fact, throughout the eastern United States it was a remarkable Winter in many respects. Very little snow fell in the latitude of Washington, little or no ice was harvested south of New York City, and the mean Winter temperature was many degrees above the normal. Peach buds began to swell in January, and many trees blossomed in February. The orchards of upper Maryland and Delaware were in full blossom March 31st, several weeks earlier than usual. The mild weather seems to have greatly favored the multiplication of this peach aphis. I first heard of it on the branches about Christmas, and received the first specimens January 7th from Still Pond, Maryland. These Winter colonies continued on the branches until Spring opened.

In the Spring and early Summer of 1890, this aphis was again in the orchards wherever I went, and in much larger numbers than the year before. It was also sent to me, or reported to me, from southern New Jersey, Virginia, the west shore of the Chesapeake in Maryland, and from southern parts of the Chesapeake and Delaware peninsula, which I was unable to visit. I could not, however, learn of its presence in any part of the extreme South, although I made diligent inquiry of many peach growers, and supplemented this by personal observation during June and July in the orchards and nurseries of middle Georgia. In Delaware and Maryland, and parts of New Jersey and Virginia, this aphis was reported everywhere to be unusually prevalent and destructive. In April, when the leaf buds were pushing, I saw them clustered upon so many shoot-axes, and so compactly, as to kill young trees, and even very considerable branches upon older trees. They were especially destructive to nursery trees and to orchards just planted. I saw one nursery in which at least 100,000 trees had been killed outright in two or three weeks' time. I also heard of half a dozen large nurseries which were entirely destroyed or very seriously affected, and of orchardists who will be compelled to replant hundreds of trees.

In the upper part of Maryland and Delaware, these aphides were less destructive than on the sandy lands of Sussex, Caroline, Calvert, and other southern counties. Toward the end of May they had almost disappeared, owing in part, at least, to the attacks of Coccinellidæ and other enemies. By mid-Summer they had disappeared completely, but were to be found on the roots as usual.

There can be no doubt, I think, as to the identity of the ærial and subterranean forms. They are alike in every important particular,—in structure as well as in color. Indeed, it would puzzle any one to tell whether a given specimen came from above ground or below. I have found colonies of identical appearance, macroscopically and microscopically, on outer limbs, on short spurs of main branches, on the trunk near the earth, on the collar just beneath the surface, and on all parts of the root system. Moreover, there are biological as well as morphological reasons for believing the two forms identical.

This aphis is visited by several ants, and is specially fostered by *Lasius claviger* Roger, a yellow species. These ants live in the earth of peach orchards, and I have seen them carry the underground form from place to place when the roots have been disturbed. If they do this when the aphides are molested, they undoubtedly do it at other times; and, if such are their habits under ground, very likely the aphides are also carried to parts above ground, which these ants also frequent. That they actually bring the aphides out of the earth has not been established by observation, but there can be no reasonable doubt. It is probable that many, at least, of the colonies which appear on the parts above ground in the early Spring have not come from Winter eggs, but from the root-infesting pseudogynæ. I believe this to be true for the following reasons: 1, The wingless viviparæ are to be found on the roots at this season in company with an ant which takes a very special interest in them; 2, The same form generally appears above ground first upon short spurs which have recently grown from the trunk and lower branches near the earth, and migrates to remoter parts of the tree only after several days or weeks; 3, In the Spring of 1890, in an old, root-infested orchard, they appeared upon the chance seedlings which were coming up all over the orchard, just as soon as they did upon the older trees. This orchard was plowed a few weeks previous, after which the stones germinated and the seedlings pushed through the furrows. They attacked the young plants as soon as they reached the surface of the earth, and probably before. I examined a great many of these tiny seedlings and found every one infested. At this time, in this orchard, colonies were just beginning to appear upon short succulent growths on the trunk and lower limbs, but none could be found upon the upper and outer limbs until considerably later. There is no reason to suppose that the colonies which I found on the seedlings at the surface of the earth and under it, crawled from the distant tops of the older trees, or were carried from them. It is much easier to think of them as coming from the infested network of roots only a few inches away. In both cases I think the aphides crawled out of the earth, or were brought out by the yellow ant.

I first collected the winged viviparous form at Still Pond, Md., in April, 1889. Soon afterwards I took it at Dover, Del., and continued to find it till June. In 1890, it was sent to me from Calvert County, Md., as early as April 14th. At Dover I could find none until April 23d, and even then those which I obtained were from a limb plucked three days previous and kept in the house, where it dried up gradually. The disappearance of the food supply probably hastened the metamorphosis, for there were none on the branch when it was brought in, and none to be found in the orchards until some days later. At Still Pond I found it abundant from May 5th to 19th. It was also plentiful at this time in orchards around Dover. A few days later I saw it in Caroline County, Md., but both forms were then becoming scarce.

Prof. Uhler believes the eggs are deposited in Autumn under the bud scales. I have not observed these, nor taken the male or female. The Autumn forms are probably not very abundant, save in exceptional years or locations.

This aphis has been called "The peach phylloxera," and the injuries due to it are very considerable. The "Yellows" itself has been ascribed to it, but on insufficient evidence. On the whole, it is more to be dreaded than the borer or the curculio. Often, however, its ravages are overlooked or ascribed to other causes, because they are carried on underground. But when, owing to favorable seasons or other causes, they appear above ground in great numbers, as in 1874 or 1890, they attract general attention and cause much alarm.

After one season in the orchards I could pick out root-infested trees with little difficulty. Generally, such trees are badly dwarfed, and make only a feeble, sickly growth. The leaves are light green or yellowish, more or less rolled at the margins, and red or purple spotted from the attacks of fungi. Frequently I have seen three-year old trees so badly infested that they were only a little larger than when set. The farmer prunes, tills, and coaxes such trees to no purpose. They will not thrive. If this sort of root pruning is pushed far enough, *i.e.*, if the aphis is very abundant, the tree dies outright. Frequently, another tree set in its place succumbs in the same way, and another still, so that certain portions of the orchards get the evil reputation of being "dead spots," yet such spots are not "dead" to vines or other fruit trees.

As already stated, nursery trees and young orchards are especially subject to injury by this aphis. If orchards pass through their first two years in safety, they become so vigorous that later attacks are not very harmful. The greater part of the mischief is done soon after planting, or at least before the trees are extensively rooted. I have known orchards in which several hundred trees were killed the first or second season, and have heard of many such. In most of these cases the roots were badly infested, while the parts above ground were not molested. Very badly infested orchards also occasionally outgrow the injury and become profitable. I have known of several.

The wide spread occurrence of this insect under ground will account for much of the trouble experienced in starting new orchards in certain old peach regions. Very few peach growers have any adequate notion of its prevalence. Extensive observation has convinced me that few orchards along the Atlantic coast from New

Jersey to Virginia are wholly exempt from it. In connection with this fact lies the explanation of another one now generally accepted by Maryland and Delaware growers, viz.: *that young trees do not thrive when set in old orchards, or in their immediate vicinity.* This statement appears to be true; and yet it is in marked contrast to the experience in Michigan, where, for more than ten years, thousands of young trees have been set successfully in place of old trees which were removed on account of yellows or for other reasons. I can only explain this contradiction by supposing the insect to be rare in Michigan. Along the Atlantic coast this aphis deserts the roots of old trees for the more succulent tissues of young ones whenever there is an opportunity. If it were abundant in Michigan the results of replanting would probably be much less satisfactory and more in harmony with the experience of eastern peach growers.

Save in exceptional years, when young orchards have suffered seriously, and when whole nurseries have been destroyed, the injury to the parts above ground is inconsiderable. The Spring of 1890 was one of these exceptional periods. The aphis appeared before, or soon after the buds germinated, and was so abundant that hundreds of shoot-axes dried up and died before they were one-half an inch long. After a few weeks all of the older trees got the start of the aphides, but even on these I saw limbs one-fourth of an inch in diameter which died, because all of their growing buds had been destroyed.

Frequently, for years together, this aphis is not common enough above ground to attract any attention. Then, for a season or two, it will be very abundant.

Although I have not seen it in New Jersey, that is only because I have not traveled there extensively. It is well known to Jersey peach growers, and especially to nurserymen living in the middle and south part of that State, where, in time past, it has done great injury, and where it appeared this year in very considerable numbers.

Undoubtedly this aphis is often transported with nursery stock. Being on the roots when the trees are dug and packed, there is nothing to prevent its transportation. Indeed, unwittingly, I introduced it myself into one locality in Michigan along with nursery trees from Maryland, not, however, into a peach region. The next season it appeared on the branches and roots, but only upon the introduced trees. The same season, many miles distant, at South Haven and St. Joseph, in the southwestern part of the State, I saw peach-trees with the peculiar stunted appearance which I have so frequently seen in the East. I pointed out this similarity to various gentlemen, and, upon examining the roots, we found the black aphides as I had predicted. None of these gentlemen had ever seen or heard of this insect, nor could I find any Michigan peach grower who was better informed. There were not many cases at either place, and all of them were young trees recently introduced from New Jersey.

This aphis seems to be a native of the United States. I can find no account of it, or of anything like it, in European literature. It is by far the most abundant of our peach aphides. In comparison, *Myzus persicæ* is very rare. I believe this insect was confined originally to some native plant, and has migrated from that to the peach, finding the latter more congenial. If so, what is this wild plant? As stated already, careful search on the tops and roots of many weeds proved fruitless. Additional examinations of hundreds of cherry trees made in the worst infested peach districts of Maryland and Delaware, since the writing of Part I, brought to light no new facts. There were some colonies of *Myzus cerasi*, but none of this insect.

I did find it, however, upon the wild *Prunus chicasa*, and on the cultivated wild goose plum. This was in Kent County and Caroline County, Maryland, in May, but after the first part of this paper was in type. I also saw it sparingly on Damsons and other types of plum. On *Prunus chicasa* it was common on the roots as well as the branches. From what was seen at that time and gathered by inquiry, I infer that it is as much at home on the Southern wild plum and its cultivated varieties as it is on the peach, but that it attacks other types of plum only exceptionally. It is possible, therefore, that *Prunus chicasa* was the original food-plant of this injurious insect, and that it has migrated to the peach in recent times.

The practical point for the fruit grower is to know how to destroy the insect.

There is probably no certain way of reaching the aphis under ground, although some claim to have driven them away by the use of very strong stable manure. When the trees have been stunted, the best thing is to pull them out and plant others. I have sometimes thought an insecticide bath might be provided for dipping the roots of suspicious trees before planting, but I have no suggestions to offer.

When the insect is on the parts above ground it can be disposed of effectually by procuring a force pump with a cyclone nozzle and spraying the foliage with insecticides.

Charles Wright, of Seaford, Del., saved his nursery last Spring by the application of strong tobacco water. One spraying sufficed.

Other nurseries in Sussex were nearly ruined, and from the great abundance of the aphides he thinks his own trees would have been destroyed but for very prompt action.

Prof. John B. Smith also informs me that he had excellent success at Vineland, N. J., in the use of whale-oil soap,—one pound to eight gallons of water. One spraying took off most of the aphides, and another, a day or two after, finished the work without injury to the foliage.

FIRE!

On the night of Friday, the 13th of September, a fire broke out in the roof of the Brooklyn Institute, in whose building the Brooklyn Entomological Society holds its meetings, and where were stored its library, collections and publications.

In the building were also the collections of Prof. Julius E. Meyer, and the library and collections of the assistant editor.

Prof. Meyer's collection, an exceedingly valuable one of Lepidoptera, was slightly damaged. With the exception of a few cases, injured by water, the collection proper is practically entire. His boxes of duplicates were almost entirely destroyed.

The main part of the collection of the assistant editor was contained in a large cabinet, the four doors of which were fortunately closed, and it thus escaped injury. An immense mass of unarranged and unmounted material, mostly in cigar-boxes, was more or less injured. The water and the dampness of the week succeeding the fire, damaged a large part of his library. The loss was estimated at about $1000. No insurance.

The entomological collections of the Institute, all of which were insured, including those formerly the property of Dr. Calverley and B. Jaeger, and of Maj. J. Carson Brevoort, were more or less damaged, as were also several cases belonging to the Society.

The Society's library, and its large stock of publications, were uninjured, with the exception of a lot of current publications that were in use in another room.

It was found necessary to remove all of the effects from the Institute building, and they were soon moved a second time. As a consequence, the Society's library and publications were necessarily disordered, and it will be some time, it is feared, before they can be rearranged.

Temporary quarters have been secured in the Hoagland Laboratory, at the corner of Pacific and Henry Streets, Brooklyn, where the Society will hold its meetings until further notice. F. H. C.

Preparatory stages of Heterocampa subrotata Harvey.

BY HARRISON G. DYAR.

The eggs were not observed, but I believe I have found the larva in its first stage, which is as follows:

First Stage.—Head depressed at the vertex, dark wine-red. Width .6 mm. Body cylindrical, smooth and shining, but annulated anteriorly. Feet normal, the anal pair elevated and rather long, the claspers apparently aborted, or perhaps withdrawn in the ends of the legs as in the mature larva. Cervical shield large, bearing a pair of horns like antlers, three branched, the branches curved and diverging, with a shorter spur near the base of the horn, all dark blackish brown. On joints 5–10, 12 and 13, from elevated shining bases grow a pair of similar, but more slender horns, not branched, but knobbed a little beyond the middle and bent, knobbed again at the end and terminating in a hair; those on the last segments are rather shorter, and all, with the anal feet, are dark blackish brown. Body dark wine-red, finely streaked at the sides with yellow longitudinally, paler ventrally. On joints 3 and 4 the streaks continue over the dorsum, confluent in a dorsal band; on joints 8, 9 and 10 is a narrow yellow line between the bases of the horns, and on joint 11 a large bright yellow dorsal patch. Length about 7 mm.

Second Stage.—Head subtriangular, notched on top, dark wine-red. Mouth and triangular plate (clypeus) paler shaded; maxillæ black. Width 1.1 mm. From the cervical shield a pair of branching horns with small spur, all relatively smaller than before, the branches hardly more than large spurs, minutely transversely creased, dark wine-red. The body lacks all the other horns and the anal feet are long. Body wine-red, finely streaked with yellow on the sides, and also on the back on joints 3, 4 and 13. An interrupted yellow dorsal stripe, widening on joints 10 and 11, and ending abruptly at the end of joint 11, absent on joints 2, 5 and 7. Anal plate and all the feet dark. As the stage progresses joints 2–4 become pale green, except a narrow wine-red dorsal line. The subventral region on joints 5, 6, 8 and 9, and a broader area on joints 11–13 is pale greenish.

Third Stage.—Head parabolic in outline, flat in front, and notched a little at the vertex; wine-red, closely covered with little, round, pale, yellowish spots, partly confluent posteriorly. In front a broad, pale, yellow, vertical band, widening inferiorly to the width of the base of the triangular plate, its sides once indented by the red ground color above the middle and the sutures also red. Labrum and antennæ pale; eyes black. Width 1.7 mm. The horns on joint 2 are three spurred, wine-red, punctured; markings much as in the last stage. A yellow dorsal band forms a triangular patch on joint 2, narrows almost to obsoleteness on joints 3 and 4, widens again on joints 5–8 and ends triangularly. It begins again in the middle of joint 9 and widens on joints 10 and 11, where it ends abruptly, excavated so as to appear furcate. It is very narrowly and faintly continued on joints 12 and 13, and is bordered on both sides by a broad wine-red band, which contains fine yellow streaks, and is continued twice downward to the feet, on joints 5 and 4 obliquely, and on joints 7 and 10 straight. The rest of the body is pale greenish. Anal feet long, wine-red. Length 12 mm. As the stage progresses, the markings approach those of the next stage.

FOURTH STAGE.—Head shaped as before, dark red-brown, the indented band in front pinkish; triangular plate white; antennæ yellow; a darker band on the head posteriorly, otherwise as before. Width 2.1–2.6 mm. The body is nearly cylindrical, enlarged dorsally (arched) at joints 8 and 9, and tapering thence to joint 13. Anal feet long, not used in walking; two three-spurred cervical horns red-brown, punctured, and tipped with a hair, only about 1.5 mm. long. Body leaf green, the dorsal band yellow between the horns, elsewhere white, distinct. It widens posteriorly to joint 7, narrows abruptly to a point on joint 8, begins again on joint 9, widening to joint 11, where it divides into two parts, which meet at the anal plate, enclosing an elongated oval patch of the ground color. Anal feet white above, brown below; three lateral brown spots mottled with yellow, the first oblique on joints 4 and 5, narrow; second on joint 7 and partly on joint 8, large, extending from the dorsal band to the foot of joint 7, darker subventrally; the third smaller, on joint 10 a little oblique and not reaching either the foot or dorsal band; some minute black spots over the lateral region. Spiracles on joint 2 reddish. Thoracic feet brown, abdominal with a fine brown band. Length 22 mm.

FIFTH STAGE.—Head shagreened, purplish brown, the apices of the lobes black. In front is a broad, pink, vertical stripe a little irregular in outline, very narrowly divided by the darker central suture and becoming white behind the vertex. Triangular plate white, labrum pinkish; maxillæ black, antennæ brown, their conical base yellow, ocelli black. Width of head 3.3–3.8 mm. Cervical horns absent, their places represented by a pair of minute tubercles bearing each a single hair. The body is smaller at joints 5 and 6, enlarged dorsally at joints 8 and 9, and slopes again to joint 13. Anal feet rather long, held out straight, their tips slightly retractile, but armed with hooks. A white dorsal stripe finely margined with dark brown and containing in its widest places a fine double line, is yellowish anteriorly on joint 2, widens on joints 4–6, and ends on joint 8. It begins again on joint 9, yellowish; widens, forks on joint 11, the parts converging on joint 13, and passing on to the anal feet, but not meeting. Body leaf green, with many small black dots and three purple-brown lateral patches mottled (especially the upper part of the last two) with crimson or pale crimson, which later becomes pale pink or cream color. The first on joints 4 and 5 upwardly oblique, covering the spiracle on joint 5; the second large, on joints 7 and 8, covering the foot on joint 7, not reaching below the spiracle on joint 8, but attaining the dorsal band; the third, on joint 10, covering the spiracle, downwardly oblique posteriorly and passing on to the foot. Anal feet purplish, thoracic brown ringed with black, abdominal tipped with brown. Spiracles yellowish centrally, broadly brown outwardly. As the stage advances a diffuse, white, subdorsal band appears on joints 8–10, tapering at each end and forming a continuation of the widest places of the dorsal band, but narrowly separated from it, or only partly confluent, but there is considerable variation in this character in different examples; also a narrow white dorsal line encroaches on the anterior part of the green patch formed by the furcation of the dorsal band on joints 11 and 12, while the anal plate, between the branches, is brown. The fine lines in the white dorsal band become pulverulent, thus approaching in appearance the numerous black dots of the lateral region. In the upper part of the third lateral patch a round, cream-colored spot appears, formed by the confluence of the mottlings. Length 30 mm.

Cocoon.—Formed under rubbish, or just under the surface of the ground of silk and grains of dirt. It is thin and of no strength.

Pupa.—Cylindrical and slightly tapering. The cremaster consists of two thick spines from an elevated base, curving sharply outward and beset with several thorn-like branches. Body punctured, cases smooth. Color dark red-brown, polished. Length about 20 mm.; width 6 mm.

Duration of this stage: first brood, 14 days; second brood, over Winter.

Food-Plants.—Witch Hazel (*Hamamelis*), Hickory (*Carya*), Maple (*Acer*), Birch (*Betula*), Dogwood (*Cornus*), and probably others. The Witch Hazel seems to be the most usual food-plant, and the larva is very inconspicuous upon this plant when seen from above in spite of its bright markings, as it resembles the curled and discolored patches of the leaves, the green lateral part of the body joining nicely to the edge of the leaf, where the larva rests. From below, however, it is readily seen, as it does not harmonize with the pale under sides of the leaves, but as it is not likely to be looked at from below, especially by birds, it would readily escape observation.

The structure of the anal feet is interesting, as illustrating the first stage in the development of *stemapoda*. They are rather long, and, though furnished with hooks, the ends can be withdrawn, just concealing the hooks as is constantly done by the larva without apparent cause. A series might be made beginning with this species through *Heterocampa unicolor* and *H. marthesia* to *Cerura*.*

Larvæ from Dutchess County, N. Y.

A NEW MORRISONIA.

BY JOHN B. SMITH.

Morrisonia rileyana sp. nov.—Head, thorax and primaries, in ground color, grayish white, with a ferruginous tinge. Palpi with a strong admixture of brown scales in their clothing. A rusty red-brown line crosses the front below the antennæ. Collar tipped with powdery black. Patagiæ black, powdery. Thoracic tufts tipped with rusty. Primaries with a broad, black, longitudinal shade, running beneath the median vein to t. p. line, then broadening to outer margin, which it reaches below the apex. Along the inner margin an irregular, narrow, whitish border only, is left. A ferruginous spot is in this black shade in the terminal space. Above this black shade the cell is filled with a rusty wash, in which the reniform is very faintly outlined by a narrow ring of the ground color. T. a. line geminate, vague, diffuse; traceable in costal region only. T. p. line geminate at inception, very oblique outwardly through costal region, becoming punctiform below and traceable through the black shade by pale venular dots. Secondaries white basally, with a broad powdery black margin outwardly; a vague discal lunule, an outer line of venular dots and a black, interrupted terminal line Beneath white, with ferruginous, and a sparse black powdering; a common punctiform outer line, and a black discal spot, most distinct on secondaries. Expands 31 mm.; 1.25 inches.

Hab.—Florida.

I have seen two specimens of this species, one in Dr. Riley's collection (coll. U. S. Nat. Museum), the locality of which I do not remember, and one from Mrs. Slosson, taken in Florida. The insect is a strongly marked one, of the same general type of maculation as in the remaining species, but yet evidently distinct. The male characters have not been examined.

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* See Packard, Proc. Boston Soc. Nat. Hist. vol. xxiv, p. 549.

SYNOPSES OF CERAMBYCIDÆ.

BY CHARLES W. LENG, B. S.

(Continued from p. 200, vol. vi.)

EURYPTERA Serville.

E. lateralis Oliv., 1795, Ent. iv, 73, p. 22, t. 3, fig. 37; Lec., 1850, J. A. P. ser. 2, i, p. 335; *cincta* Hald., 1847, Trans. Am. Phil. x, p. 63; *obsoleta* Hald., l. c.; *distans* Germ., Ins. Spec. nov. 1824, p. 524; Lec., l. c.; *marginicollis* Dej., Cat. 3 ed. p. 381.

Length 9—10 mm.; .36—.40 inch. *Hab.*—Pa., Ky., La., Fla., Mass.

This insect is similar to the *Lepturæ* in general appearance, and is entirely black, except the mouth parts, sides of thorax above and beneath, humeri and half the epipleuræ red. Thorax narrowed in front, posterior angles acute and distinct. Elytra densely punctulate.

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Before entering upon the last great division of the family, it is proper to mention certain species which have been discovered since the tribes they enter were treated. These are:

Hypexilis pallida Horn, Trans. Am. Ent. Soc. xii, 177.

Length .22 inch.; 5.5 mm. *Hab.*—Texas.

"Slender, pale testaceous. Head across the eyes wider than the thorax, surface coarsely punctured. Thorax elongate, one-third longer than wide, sides at apical third parallel, then gradually wider to two-thirds, arcuately narrowing to base, which is slightly wider than the apex, disc slightly flattened posteriorly, surface rather coarsely punctured and rugulose. Elytra wider than the thorax, humeri distinct; sides straight, slightly converging; apices separately rounded, suture at tip slightly dehiscent, disc rather flat, a vague elevation from the humeri to near the tip; surface evenly and closely punctate, more finely than the thorax. Thorax beneath coarsely, but sparsely punctate; abdomen shining, very sparsely punctate."

Gracilia obliquata Horn, l. c. p. 174.

Length .20 inch.; 5 mm. *Hab.*—Texas.

"Form slender, pale brownish testaceous, subopaque. Head behind the eyes moderately coarsely punctate. Thorax oval, a little longer than wide, slightly narrower at base than apex, sides moderately arcuate, disc feebly convex, a vague median sulcus and one on each side, oblique, slightly in front of middle; surface moderately coarsely punctate. Elytra slightly wider than the thorax; sides parallel, apices separately rounded, disc subdepressed, a vague oblique depression on each side from the humeri to the suture; surface finely pubescent, rather sparsely punctate, the intervals very finely granular, apices nearly smooth. Thorax beneath coarsely not closely punctate; abdomen moderately shining, very sparsely punctate. Femora very strongly clavate."

Necydalis barbaræ Rivers, Ent. Am. vi, p. 112.

Length 22 mm.; .87 inch. *Hab.*—California.

The description of this species having been recently printed in this journal, need not be here repeated.

Elaphidion cinereum Oliv., Ent. iv, 70, p. 69, pl. 8, fig. 102; Chev., Ann. Fr. 1862, p. 261; *fuscatus* Dej., Cat. 3 ed. p. 352.

Length .28—.44 inch.; 7—11 mm. *Hab.*—Cuba, So. Fla., Key West.

This species was collected at Key West by the late Mr. Morrison.

"Pale brown, clothed with dense gray pubescence; elytra marked with a brown longitudinal line" (Oliv). The antennal joints 3–7 are unispinose at tip, the thighs and elytral tips are unarmed. The femora are slightly more clavate than is usual in *Elaphidion*. In addition to the brown elytral line described by Olivier, there is usually a second line and an obscure cloud behind the middle of the elytra and several brown lines upon the thorax.

Elaphidion lanatum Chev., Ann. Fr. 1862, p. 260.

Length 4—5.5 mm.; .16—.22 inch. *Hab.*—Cuba, So. Fla.

"Elongate, convex, clothed densely with grayish white hair; antennæ with joints 3—10 bispinose, the spines decreasing in length. Thorax rounded, marked with a smooth medial line and two small black anterior tubercles; elytra moderately convex, declivous behind, quadrispinose; body beneath and legs minutely and obsoletely irrorate with fuscous; ♀."

Has occurred with the preceding at Key West. Both species have been identified by Dr. Horn.

Phymatodes juglandis n. sp.

Resembles *P. decussatus* Lec. differing by the coarsely punctate elytra and the very oblique and angulate anterior elytral fascia.

Dark brown; antennæ, underside and anterior portion of elytra lighter, the latter bearing two fasciæ, the anterior acutely angulate, the posterior broader, oblique and arcuate; the entire insect clothed with long fine hair, distantly placed, except on the elytral fasciæ. Head and thorax coarsely punctate, elytral punctures very strong. Thorax rounded and somewhat protuberant at sides, moderately convex on the disc; elytra parallel to one-third, thence slightly arcuately expanded to near the apex, which is broadly rounded, flattened on the disc. Antennæ ♂ about two-thirds as long, ♀ about half as long as the body.

Length 4.5—6.5 mm.; .18—.26 inch. *Hab.*—Los Angeles, Cal.

Several specimens sent by Mr. D. W. Coquillet to Dr. Horn, and by him kindly given to me. It is believed to live on the California Butternut (*Juglans californica*).

CORRESPONDENCE.

In Mr. Leng's very valuable synopsis of *Leptura* which appeared in the October number of Entomologica Americana, the rarity of *L. plebeja* Rand. is noticed. I have seen several examples from various parts of Canada, and have one in my collection, all of which were females. There is no good description of the species, and Dr. LeConte's two lines in the synopsis referred to, reproduced by Mr. Leng, are all that can be depended on for its differentiation. The female has the last ventral segment convex, elongated, not greatly narrowed to apex, depressed posteriorly in the middle, and deeply, broadly, nearly rectangularly emarginate; the sides not being depressed project backwards like blunt horns, their apices with stiff hairs.

In regard to *L. hæmatites* and *exigua*, Mr. Leng has overlooked (it is to be regretted) Dr. Horn's latest determination from an examination of the types in the British Museum, according to which the species should be thus tabulated.

L. exigua Newm., *saucia* Lec.

L. nana Newm., prothorax and elytra concolorous.

var. *hæmatites* Newm., prothorax dull red.

See Trans. Am. Ent. Soc. xv, 301; Can. Ent. xxi, 32, 108.

In this connection it may not be amiss to state that there are two races of *L. vibex* Newm.—one with the thorax entirely black, and one with it entirely yellow rufous—found separately in different localities. JOHN HAMILTON.

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Dr. Hamilton is quite right, and I am sorry, because it is an important error. The subjoined note may be added as a postscript to what he says, and will save the reader hunting up references.

"**L. exigua** Newn.—Antennæ piceous, the basal joint yellow; anterior femora entirely, the middle and posterior yellow at base. Terminal ventral segment of female with a slight tuberosity near the apical margin. This species may have the thorax entirely piceous, usually it has the entire margin yellow. The disc is also more densely punctured than in *nana*, while the form of the thorax is shorter and broader. *L. saucia* Lec. is synonymous."

"**L. nana** Newn.—Antennæ always piceous. Anterior femora and base of middle yellowish. Terminal ventral segment of female simple."

"This species varies in color. The upper surface is often entirely piceous. By far the larger number I have seen have a reddish thorax, constituting the variety *hæmatites* Newn. One specimen before me is piceous, with the head reddish yellow" (Horn, Trans. Am. Ent. Soc. xv, p. 301).

L. aspera Lec.—Mr. O. S. Westcott, of Chicago, has called our attention to a discrepancy in the synoptic table, in reference to this species, to correct which the words "except *aspera*" should be added to Section E on p. 186. It has been taken abundantly in British Columbia, and bears out the description made from a few specimens, being very black, and the elytra rough at base.

C. W. LENG.

PREPARATORY STAGES OF SAMIA CYNTHIA Dr.

BY WILLIAM BEUTENMULLER.

Egg.—Oval, creamy-white, covered with an olivaceous green substance, used to adhere the egg to the leaf. Length 1.6 mm. Duration of this stage fourteen days. Laid in small masses of about twelve on the underside of leaf. Total number of eggs laid about 250.

Young Larva.—Head jet-black, shiny, smooth, mouth parts yellowish brown, mandibles pitchy brown; cervical shield black. Body yellow, with a series of two rows of black tubercles along the dorsal region, and one row along the subdorsal and another row along the sides below the spiracles also black All the tubercles have at the apex three or four small spines, each bearing a rather long, sordid white hair. Along the spaces between each row of tubercles, is a row of black spots. Body beneath yellow, thoracic feet shiny, black; abdominal legs concolorous with the body, but with a black corneous patch on the outerside of each. Over the head are also scattered a few sordid white hairs. Length 2.50 mm. Length two days old, 3 mm.; three days old, 5 mm.; four days old, 7 mm.; five days old, 7 mm.; getting ready to moult.

After First Moult.—No perceptible change from the previous stage, except that the cervical shield is now concolorous with the body. Length 8 mm. (six days old); seven days old, 9 mm.; eight days old, 10 mm.; getting ready to moult.

After Second Moult.—All the tubercles in this moult are now yellow, except the lateral row remaining black. Head yellow, with a black spot on each side of the anterior part; mandibles pitchy black, otherwise the same as the preceding moult. Length 12 mm. (nine days old); ten days old, 14 mm.; eleven days old, 16 mm.; twelve days old, 19 mm.; thirteen days old, 21 mm.; getting ready to moult.

After Third Moult.—The body color is now pale whitish green, as are also the tubercles, except those along the side black, with their extremities whitish. Head and cervical shield yellowish green. Anal plates also yellowish green, margined with blue; underside greenish; also all the feet. The body and tubercles covered with a white powder. Length 23 mm. (fourteen days old); fifteen days old, 25 mm.; sixteen days old, 27 mm.; seventeen days old, 30 mm.; eighteen days old, 32 mm.; nineteen days old, 35 mm.; getting ready to moult.

AFTER FOURTH MOULT.—No difference, except that the body is somewhat deeper in color. Length 38 mm. (twenty days old); twenty-one days old, 40 mm.; twenty-two days old, 43 mm.; twenty-three days old, 46 mm.; twenty-four days old, 48 mm.; getting ready to moult.

AFTER FIFTH, THE LAST MOULT.—Body pale green, with the extremities of all the tubercles bright blue and the bases yellowish green. The row of tubercles along the sides black. Head and cervical shield same as in previous moult, also the anal plates. Thoracic feet yellowish green; abdominal legs with a bright blue patch at the base of the outerside of each. Length 50 mm. (twenty-five days old); twenty-six days old, 52 mm.; twenty-seven days old, 54 mm.; twenty-eight days old, 56 mm.; twenty-nine days old, 58 mm.; thirty days old, 60 mm.; thirty-one days old, 62 mm.; full grown.

FOOD-PLANTS.—Ailanthus (Hop-tree), Tulip-tree, Barberry, Linden, Maple, Wild Cherry, Plum, Spireæ, Sweet Gum, Dogwood, Sassafras, Spicebush, Nannyberry, Holly and Caster-oil plant; also said to feed on Sumac, Pimpernel, Honey-suckle, Spindletree, Bitter-sweet, Laburnum, Willow and Celery.

Note on the genus Protenor Stal.

By E. BERGROTH, Forssa, Finland.

In his "Check List" Mr. Uhler has quoted the genus *Tetrarrhinus* Prov. as a synonym of *Protenor* Stal. In his faunistic work on the Hemiptera of Canada, p. 335, Mr. Provancher protests against this synonymy in saying: "M. Ashmead a confondu ce genre avec le *Protenor* de Stal, mais ce dernier dit du *Protenor:* articulo primo antennarum capitis apicem haud attingente."

This is a falsification of Stal's description. Stal says (Ofv. Vet. Akad. forh. xxiv, 1867, p. 543): "antennis -- articulo primo capite paullo breviore." There is, of course, quite another meaning in these words than in the ones substituted by the learned abbot, and there can be no doubt that Mr. Uhler was right in uniting *Tetrarrhinus quebecensis* Prov. with *Protenor Belfragei* Hagl.

"Among the Moths and Butterflies," is the title of a new book for young folks, by Julia P. Ballard, author of "Insect Lives." To quote a newspaper book review: "it is so fascinating that every child who reads it will at once begin to make a collection of caterpillars and cocoons." F. H. C.

Spider's Web Cloth.—A new industry has sprung up by which spiders are added to the list of insects of importance in arts and industries, as witness the following excerpts from the *Washington Post:* An Englishman, named Stillbers, it is said, has actually made a cloth of spiders' web which has been employed for purposes of surgery, and has gone quite extensively into its manufacture.

The spiders are obtained from tropical countries, mostly from Africa and South America, and are very large. A peculiar feature of the business is that the spiders spin the best web when they are intoxicated. To accomplish this a liquid composed of chloroform, ether and fusil oil is allowed slowly to evaporate in the room where the spiders are housed, and they are thus kept constantly in a mild state of intoxication. The little creatures are placed in octagonal cases, and are fed on insects of various kinds. In one room there are some 5000 of these cases. The spiders lay their eggs, and about the latter spin cocoons. These cocoons are gathered, and are prepared for weaving by some such processes as are undergone by the cocoon of the silk-worm. The weaving itself is a closely guarded secret. Each cocoon is said to yield twenty-five to one hundred yards of thread. The texture of the woven material resembles, somewhat, ordinary silk, and after it is bleached it becomes brilliant and smooth. F. H. C.

Eristalis tenax has been unusually common in this vicinity during the year. It has been aptly termed the "drone-fly," not alone by virtue of its resemblance to the male honey bee, but on account of its habits. A large portion of its time appears to be spent simply in idling, flitting about from one flower to another with no apparent purpose in view.

F. H. C.

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Zeuzera æsculi (*pyrina*) mentioned in a previous number (p. 31) as occurring at Newark and Arlington, N. J., has been taken in Central Park, N. Y. City, by Mr. Beutenmüller, and during the Summer I found it also at Orange, N. J., at electric lights. Although the insect has been known for a number of years in this country, its spread has been inconsiderable. The addition of Central Park and Orange increase the radius of its occurrence to only about fifteen miles.

F. H. C.

DESCRIPTION OF THE PREPARATORY STAGES OF DATANA ANGUSII G. and R.

BY WM. BEUTENMULLER.

Egg.—Ovoid, white, with the base slightly flattened; laid in small masses of about thirty, on the underside of leaf.

Young Larva.—Head and cervical shield jet-black, shining. Body greenish brown, with the second and third segments claret-red above and below. This color is also present on the dorsal region of the sixth, seventh, eighth and eleventh segments. The four stripes along each side of the body are pale lemon-yellow, except where they are obscured by the claret-red color. The stripes on the underside of the body are also pale lemon-yellow. All the stripes are equidistant, and as broad as the intervening spaces. Thoracic feet jet-black; abdominal legs same color as the body; anal clasps jet-black, shining. Length 3 mm. Duration of this stage about six or seven days.

After First Moult.—The ground color in this stage is now somewhat darker, as is also the claret-red color of the segments as described in the young larva. Length 6 mm. Duration of this stage six days.

After Second Moult.—The body in this stage is of a purplish brownish color, with the stripes somewhat narrower than the intervening spaces. The claret-red color is now quite faint and suffused with the ground color. Body beneath same as above, with the abdominal legs concolorous with a black corneous patch on the outerside of each. Length 9 mm. Duration of this stage eight days.

After Third Moult.—The stripes are now considerably narrower than the intervening spaces, and the body somewhat deeper in color, the cervical shield blackish, and abdominal legs pinkish. Length 16 mm. Duration of this stage nine days.

After Fourth, the Last Moult.—Head and cervical shield jet-black, shining. Body black, with the four now pale yellow stripes along each side very narrow, all being much narrower than the intervening space. The three stripes on the underside are also now pale yellow; the one along the middle is the broadest, and the one on each side being broken by the legs; the intervening spaces much wider than those above. Thoracic feet jet-black; abdominal legs reddish, with the extremities black. On the fourth, fifth, tenth and eleventh segments are two reddish patches. Body with sparsely distributed, sordid white hairs, which are also present in all the preceding stages. Length 30 mm. Full grown larva 55 mm. Duration of this stage not observed.

FOOD-PLANTS.—Various species of Hickories, Walnut, Butternut and Beech.

A NEW COPIPANOLIS.

BY JOHN B. SMITH.

Copipanolis stigma sp. nov.—Head, thorax and primaries deep brick-red; palpi paler. Primaries with a slight admixture of yellowish scales, most evident along costal region. Median lines vaguely marked, scarcely defined; ordinary spots yellowish white; orbicular small, round; reniform moderate in size, rather irregular. Secondaries whitish at base, with reddish powderings, becoming more dense outwardly. Beneath somewhat paler than above, more obviously yellow powdered. Expands 1.15 inches; 29 mm.

Hab.—Florida.

A single male specimen from Mrs. Slosson's collection. The species is like *cubilis* in ground color, but lacks the distinct median lines, and, on the contrary, has the ordinary spots distinct, contrasting, yellowish white. In structure and habitus it otherwise resembles the typical species closely.

SOCIETY NEWS.

BROOKLYN ENTOMOLOGICAL SOCIETY.—September 2d. The meeting was occupied by an exchange of collecting and other entomological experiences. Mr. Dietz gave an account of the field meeting at Jamesburg, and Mr. Chittenden exhibited a series of rare species of Coleoptera, principally Carabidæ, taken at an electric light at Orange, N. J., in June.

October 7th.—Meeting at the Hoagland Laboratory. The time was largely taken up by business matters, much of it due to the fire, which destroyed part of the Brooklyn Institute building, and necessitated a removal of the property and effects of the Society. Fortunately, the Society's loss was slight.

Prof. Smith called attention to a series of studies on the mouth parts of Diptera, made by himself, and presented in outline a new nomenclature of parts, homologizing the lapping with the mandibulate mouth, and he told how the latter had become transformed into the former, all the steps being still traceable.

A. C. WEEKS,
Recording Secretary.

NOTICE.

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ENTOMOLOGICA
AMERICANA

VOL. VI. BROOKLYN, DECEMBER, 1890. No. 12.

REVIEW OF THE NORTH AMERICAN SPECIES OF BYTHOSCOPUS.

BY E. P. VAN DUZEE.

Genus **BYTHOSCOPUS** Germar.*

Head with the eyes as wide as the pronotum. Vertex short, of nearly equal length across its whole width, much deflexed and confounded with the front in a common convexity. Ocelli placed on the front of the face opposite the middle of the eyes, to which they are a little more approximated than to the hind margin of the vertex. Antennæ rather short, inserted under a prominent oblique ledge. Front in the ♀ rather convex, apex broad, forming a rounded lobe each side of the base of the clypeus. Clypeus broad, ovate, suddenly contracted at the base, narrowed to the apex, where the sides are somewhat compressed around the base of the rostrum. Loræ long and narrow, a little tumid. Cheeks narrow, forming a slender margin beyond the loræ, but not attaining the apex of the clypeus. An oval, minutely punctured area occupies each side of the front basally. In the ♂ the loræ and base of the clypeus are confused with the greatly swollen apex of the front, obliterating the sutures and imparting a square appearance to the face. Pronotum moderately convex, anterior margin rounded, posterior concave; lateral angles not prominent; latero-posterior angles rounded; surface covered with transverse ridge or rugose punctures arranged somewhat obliquely behind the eyes. Scutellum large, with a transverse impressed line before the apex and a nearly smooth area within the basal angles. Elytra surpassing the abdomen a little, the suture straight; costa feebly convex; membrane without an appendix; texture submembraneous, nervures commonly distinct; ordinarily there are one basal, two discal, three anti-apical and five apical areoles. Wings membraneous, nervures distinct, supernumerary cell wanting (see Ent. Amer. v, p. 166).

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* For generic synopsis see Ent. Amer. v, p, 166, September, 1889.

Genital characters: *Male.*—Ultimate ventral segment similar in form to the penultimate. Pygofers together broad oval, their suture nearly straight; the anal opening rather small, ovate. Styles slender, flaccid, about half the length of the pygofers. Plates a little longer than the styles, narrow, ligulate, slightly contracted toward their base and curved to correspond to the form of the pygofers, sparingly ciliated with soft hairs.

Female.—Ultimate ventral segment various in form, affording good specific characters. Pygofers rather slender, about as long as the venter, without bristles in our species.

The species of this genus exhibit but slight structural differences, but are subject to great variation in color, this rendering them a difficult group to study. They are well represented in my own collection, and I have examined considerable material received from correspondents, and believe our species are here pretty accurately defined so far as they are known to me. Three of these—*fenestratus*, *minor* and *pruni*, are very closely related, and will probably prove to be but forms of a single variable species. The males of most of the species differ but little, and are difficult to separate without the corresponding females. The male of *sobrius* is unknown to me; the sexes of *variabilis*, *fenestratus* and *nigrinasi*, I have taken *in coitu;* of *distinctus* there can be no question, and the males of *cognatus*, *minor* and *pruni*, I think are correctly referred.

Two described North American species of this genus are still unknown to me, viz.: *fagi* Fitch and *flavus* Walker, and there are doubtless many undescribed forms yet to be brought to light by our collectors. In geographical distribution this genus is largely boreal, such species as do occur in the South seeming to be mountain-loving forms. All the species that have thus far passed through my hands are to be found in western New York. They live on trees, from which they can best be obtained by beating over an umbrella.

I am greatly indebted to Mr. P. R. Uhler for the loan of his very valuable material in this genus, and as well to my other correspondents who have responded so generously to my application for material.

The following synoptic table is based largely on the form of the ultimate ventral segment of the female, and is intended solely for the species hereinafter described:

Synopsis of the Species.

1. (2) Elytra with four apical and two anti-apical areoles; brown or piceous, elytra maculated, beneath yellow . . . . 3. **distinctus.**
2. (1) Elytra with five apical and three anti-apical areoles.
3. (6) Last ventral segment truncated, rounded or subtriangular, with an apical notch, but without projecting teeth.

4. (5) Last ventral segment short, with a broad shallow notch. 8. **nigrinasi.**
5. (4) *a*. Last ventral segment long, rounded, with a deep notch; ♂ black, ♀ sulphur-yellow, commonly marked with black. 1. **variabilis.**
   b. Last ventral moderately long, subtriangular with a shallow notch, color fulvous brown . . . . 2. **sobrius.**
6. (3) Last ventral segment produced in a more or less distinct tooth each side of the apical notch.
7. (8) Last ventral segment cylindrical, notch widened, almost obsolete, the short teeth when present incurved, disc with a broad, shallow depression; gray, elytra subhyaline, maculated on the suture. 4. **cognatus.**
8. (7) Last ventral segment more or less distinctly triangular, with the apical teeth usually distinct.
9. (12) Elytra clouded, fenestrate with subhyaline ♀.
10. (11) Pale fulvous, or cinereous-fulvous; last ventral segment shorter, teeth small . . . . 7. **minor.**
11. (10) Cinereous, or fulvous-brown, last ventral segment longer, teeth large. 5. **fenestratus.**
12. (9) Elytra hyaline, nervures brown, a discal spot, and commonly the apex, clouded; vertex piceous, with a yellow band connecting the ocelli. 6. **pruni.**

1. **Bythoscopus variabilis** Fitch.

♀ *Athysanus do.*, Fitch, Homop. N. Y. State Cab. p. 60, 1851; Trans. N. Y. State Agric. Soc. xviii, p. 853, 1858; Rathvon, Mombert Hist. Lancaster County, Pa., p. 551; Packard, U. S. Ent. Com. Bulletin No. 7, p. 128 (after Fitch); Smith List of Ins. of N. J. p. 446, 1890.
Bythoscopus do., Walk., List of Homop. iii, p. 876; Provancher, Petit Faun. Ent. du Can. p. 289, 1889 (erroneously written *variegatus*).
Pediopsis do., Van Duzee, List Muskoka Hemip. Can. Ent. xxi, p. 9, 1889.
Macropsis clitellarius Provancher, Nat. Can. iv, p. 877, 1872 (= var. D).
♂ *Athysanus abietis* Fitch, Homop. N. Y. State Cab. p. 60, 1851; Trans. N. Y. State Agric. Soc. xvii, p. 748, 1857, and xviii, p. 854, 1858, Rathvon, Mombert Hist. Lancaster County, Pa., p. 551; Packard, U. S. Ent. Com. Bulletin, No. 7, pp. 129–235.
Bythoscopus do., Walk., List of Homop. iv, p. 1162.

Head closely punctured. Vertex short, with a longitudinal central ridge; front more convex in the female than in the male, pronotum with fine, transverse rugæ; anterior disc of the scutellum minutely punctured, apical field transversely striate; ultimate ventral segment of the ♀ long, produced posteriorly with a deep central notch. Length 5 mm.

Color: *Male.*—Piceous black; head yellow, apex of the front, a band on its base and another on the base of the vertex black, the two latter frequently confluent at their ends; hind edge of the pronotum and a band on the anterior submargin which may be extended over most of the disc as a suffused cloud, yellow. Legs yellow, outer face of the posterior and sometimes the anterior and intermediate tibiæ blackish. Commissural nervure with a yellow spot; scutellum in pale examples with two diverging lines and the tip yellow. Beneath yellow, sometimes varied with black.

Female.—"Sulphur-yellow; elytra commonly with an oblique black vitta, then tips pellucid; vertex, thorax and scutel often fulvous or black" (Fitch). Tergum black, the segments edged with yellow.

Dr. Fitch notices six varieties, as follows:

Var. A.—Dull yellowish white throughout.
" B.—Bright sulphur-yellow throughout.
" C.—An oblique black stripe on each elytron.
" D.—Vertex, thorax and scutel tawny yellow.
" E.—Vertex and thorax tawny yellow, scutel black.
" F.—Vertex, thorax and scutel black.

To these I would add:

Var. G.—Ferruginous brown, clavus pale yellow.

The oblique black stripe mentioned in var. C follows the claval suture, and may be present in any of the other varieties, and is probably never absent in D, E, F and G, which thus show a regular gradation in the extent of dark markings they exhibit.

This species occurs on birch, but does not appear to be common, at least not around Buffalo. May to July, Lancaster, N. Y., var. C, E, and F; Ridgeway, Ont., var. C, one pair *in coitu* received from Mr. A. H. Kilman; Ottawa, Ont., one ♂ kindly given me by Mr. W. H. Harrington, has the scutellar and commissural margins of the clavus bright yellow; Quebec, L'Abbe Provancher var. A, C and D (= *Macropsis clitellarius* Prov.); Muskoka, Ont., July, 1888, var. A, C and G; New Haven, Ct., one ♂ swept from low bushes in a grove June 4, 1883. The pair kindly sent to me by my friend, Mr. Kilman, was of special interest, as proving the identity of this species and *abietis* Fitch.

2. **Bythoscopus sobrius** Walk. List Homop. Insects iii, p. 874, 1851.

Testaceous yellow above, pale straw color beneath, elytra deep fulvous brown, with a slight vinous tinge; vertex with an obsolete transverse yellow vitta. Length 5 mm.

Face rather convex, closely punctured; vertex with an impressed line above the ocelli and an obscure central ridge; base of the front with a faint yellowish line; cheeks, loræ, apex of the clypeus and all beneath pale straw yellow. Pronotum large, sloping quite strongly toward the head; finely transversely wrinkled and punctured, with a calloused area behind the eye. Elytra fulvous brown, commissural nervure obscurely alternated with pale. Wings very faintly smoky, nervures brown; ultimate ventral segment of the ♀ longer than the penultimate, apical margin rounded, notch small.

I am indebted to Mr. W. H. Harrington for a fine female example labeled "Ottawa, July 8th." Another ♀ taken by myself at Lancaster, N. Y., May 31, 1887, differs from this only in being more cinereous in color; in the presence of a black dot above the ocelli, a dusky line on the base of the front and on the posterior margin of the dorsal segments of the abdomen, and in having the elytra of a deeper brown color.

This large, plainly colored species is most closely related to *variabilis*, to which it is allied by the form of its ultimate ventral segment, its convex face and sloping pronotum, otherwise it is quite distinct. Its rediscovery at Ottawa, by Mr. Harrington, is interesting as placing in its systematic position one more of Walker's numerous uncertain species.

3. **Bythoscopus distinctus** n. sp.

Pale yellow, or cinereous punctured with fuscous above, yellow beneath; elytra subhyaline maculated with brown ♀, or fuscous with a commissural and large costal spot hyaline ♂; apical areoles four, anti-apicals two. Length 3.5—4.5 mm.

Male.—Vertex, pronotum and scutellum punctured with fuscous. Pronotum more or less clouded within the posterior and lateral margins. Scutellum marked with a triangular spot within the basal angles, the transverse impressed line, two points before this and sometimes the median line black. Elytra fuscous, darker on the clavus and apex of the corium and marked with a whitish spot before the apex of the clavus and a larger costal spot on the anti-apical areoles, costal nervure yellow. Wings subhyaline, nervures fuscous. Beneath pale yellow, clouded with blackish on the pleural pieces; legs pale, spines of the tibiæ brown; tergum fuscous, segments edged with yellow. Genitalia whitish, pygofers embrowned.

Female.—Commonly paler than the male, with fewer fuscous punctures above; on the elytra the hyaline spots are more extended, or they may be entirely subhyaline with two brown spots on the commissural margin of the clavus and a shade on the apex of the corium.

In this species the vertex is short. the face, but feebly convex, the apex of the clypeus rather narrow, rounded, and the margins a little reflexed, and the head, pronotum and scutellum, are covered rather sparingly with large punctures. Last ventral segment of the female long, cylindrical, with a distinct, but *narrow* median groove, its apical margin feebly rounded and minutely notched on the middle.

Described from five male and nine female examples. Buffalo, one example swept from low bushes of *Populus grandidentata* July 10, 1889. Lancaster, N. Y., July and August. Niagara Falls, on oak M. C. Van Duzee. Maryland, June 11th, and Illinois, Uhler. Mt. Balsam, N. C., July, 1890, W. J. Palmer, Jr.

Although a very distinct species, the pale females bear some resemblance to *cognatus*, from which they may be distinguished by the number of elytral areoles and the narrow groove of the ultimate ventral segment.

4. **Bythoscopus cognatus** n. sp.

Cinereous or greenish brown, coarsely punctured, elytra subhyaline, alternated with brown and white along their suture; front blackish. Length 5 mm.

Vertex tinged with yellow; eyes and ocelli brown, front piceous or brown; clypeus paler, its rounded apex yellowish; loræ black, with a yellow discal spot; cheeks black, with a marginal yellow cloud below the eye. Pronotum paler on the anterior margin, disc transversely wrinkled and punctured; scutellum with the ordinary divergent pale lines and black discal dots, elytra cinereous, subhyaline, with a brown cloud from the base of the anti-apical areoles to tip of the clavus, sometimes extended to the apical margin, their suture pale, alternated with fuscous. Wings slightly obscured, nervures brown. Pectoral pieces piceous black, margined more or less broadly with yellow. Legs and venter brown; connexivum, and sometimes the margin of the ventral segment washed with yellow. Last ventral segment of the female a little longer than the preceding, apical angles rounded, disc with a *broad*, shallow, longitudinal depression, across which the apical margin is slightly concave, teeth minute, depressed. Plates of the male stout, covered with short hairs.

Described from two males and five female examples taken at Muskoka, Ont., July, 1888. A pale greenish white ♀ taken at Lancaster, N. Y., May 31, 1877; is probably immature. This large well marked form can be distinguished from our other maculated species by its size, uniform cinereous coloring and the form of the last ventral segment of the female.

5. **Bythoscopus fenestratus** Fitch.

Athysanus fenestratus Fitch., Homop. N. Y. State Cab. p. 60, 1851; Trans. N. Y. State Agric. Soc. xviii p. 853, 1858; Rathvon, Mombert Hist. Lancaster, County, Pa., p. 551; Packard, U. S. Ent. Com. Bulletin No. 7, p. 128 (after Fitch); J. B. Smith, List Insects of N. J. p. 446, 1890.

Bythoscopus do., Walker, List of Homop. iv, p. 1162; Provancher, Petite Faune Ent. du Can. iii, p. 289, 1890.

Pediopsis do., Van Duzee, List Muskoka Hemip. Can. Ent. xxi, p. 9, 1889.

Pediopsis flavescens Provancher, Nat. Can. iv, p. 376, 1872; Petit Faune Ent. du Can. iii, p. 295, 1890.

Cinereous, or ferruginous brown, paler beneath; front usually discolored; elytra more or less deeply infuscated, fenestrated with whitish hyaline. Length about 4.5 mm.

Female.—Face finely punctured, ocelli connected by a pale yellowish band, above and below which is a darker shade; front dusky, sometimes almost piceous, with a smooth, paler area on either side; cheeks and sides of the clypeus pale; eyes and ocelli brown. Pronotum finely transversely wrinkled and punctured; scutellum sometimes more deeply colored than the pronotum, basal angles obscurely darker. Elytra grayish, fulvous, or even deep fuscous brown; scutellar margin of the clavus, a spot near its apex, another on the apex of the discal areoles, and a larger one on the anti-apicals whitish hyaline. Wings subhyaline, nervures pale brown. Beneath yellow or fulvous, sometimes obscured on the venter and marked with black on the pectoral pieces, front of the femora and tibiæ. Last ventral segment subtriangular, produced medially in two distinct, subacute teeth.

The male differs from the female only in being paler, at least on the front, and in having the elytra of an almost uniform fulvous brown tint with hardly a trace of the hyaline spots.

Buffalo, N. Y., June–August; Muskoka, Ont., July, 1888; Ridgeway, Ont., A. H. Kilman; Mt. Balsam, N. C., July 26, 1890, W. J. Palmer, Jr. Lives on birch. It is subject to considerable variation in the tint of its general color and the distinctness of the fenestrate markings of the elytra. From the preceding species it may be distinguished by the form of the last ventral segment of the female, from *pruni* by its clouded elytra, and from *minor* by its larger size, deeper color and the larger teeth of the last ventral segment.

6. **Bythoscopus pruni** Prov., Petite Faune Ent. du Can. iii, p. 290, 1890.
Athysanus pruni Fitch, MS.

Cinereous or grayish yellow, punctured with fuscous; corium hyaline, with the apex and a transverse spot fuscous; face yellowish; vertex banded with black. Length 4–4.5 mm.

Face yellow; front and apex of the clypeus blackish in the female; vertex black, with a broad yellow band connecting the ocelli; front and vertex coarsely punctured, the latter slightly tumid on the middle. Eyes brown, ocelli black. Pronotum yellowish cinereous, more or less obscured with fuscous punctures and commonly showing two or three black points on the calloused area behind the eye; surface with the transverse striæ and scattering punctures more obvious posteriorly; scutellum cinereous, yellowish, or sometimes ferruginous, marked as in *distinctus*. Elytra hyaline, more or less obscured, commissural nervure whitish, interrupted on its middle by a fuscous spot and with a smaller one at tip, nervures brown, apex of the corium clouded with brown, the transverse nervures fuscous margined. Wings obscurely smoky hyaline, nervures brown. Beneath yellow, pleural pieces marked with black; tergum blackish, the segments pale margined. Legs pale, spines of the hind tibiæ and a line on their face at base brown. Genital characters as in *fenestratus*.

Described from ten males and four female specimens. Muskoka, Ont., July, 1888; Quebec, Provancher; Ottawa, Ont., Harrington; Saskatchewan, July 22d; White Mountains, "subalpine" Scudder; Massachusetts and Maine. The specimens from the four last mentioned localities were received from Mr. Uhler; that from the White Mountains bearing the label "*Athysanus pruni* Fh." M. Provancher's example came labeled "*Pediopsis cinctifrons*," which he afterward discarded for the one here employed.

This species is very closely related to *fenestratus*, of which it may prove to be the northern form. It can be best distinguished by the black transverse bands on the vertex, the hyaline elytra and the maculated scutellum. The similarity of genital characters would seem to indicate something less than a specific difference.

7. **Bythoscopus minor** Fitch.

Athysanus minor Fitch, Homop. N. Y. State Cab. p. 60, 1851; Trans. N. Y. State Agric. Soc. xviii, p. 583, 1858; Rathvon, Mombert Hist. Lancaster County, Pa., p. 551; Packard, Bulletin No. 7, U. S. Ent. Com. p. 128 (Fitch); J. B. Smith, List Insects of N. J., p. 446, 1890.

Bythoscopus do., Walker, List of Homop. iii, p. 876.

Pediopsis do., Van Duzee, List Muskoka Hemip. Can. Ent. xxi, p. 9, '89.

Macropsis ocellatus Prov., Nat. Can. iv, p. 377, 1872.

Pale yellowish, cinereous, or ferruginous brown; front dusky; elytra fenestrate with hyaline; last ventral segment of female short, with two small teeth on the hind margin. Length 4 mm.

Female.—Face coarsely punctured, leaving the smooth frontal areas quite strongly contrasted, ocelli brown, sometimes conspicuous in pale examples, apex of the clypeus narrowed and somewhat produced; front sometimes embrowned as in *nigrinasi;* disc of the cheeks and margins of the pectoral pieces and ventral segments paler, sometimes clear yellow; tergum, disc of the pronotum, scutellum and elytra commonly more deeply colored; the latter with a whitish spot next the scutellum, another on the discal areoles, a larger one on the anti-apicals, and a feeble indication on the apex of the clavus. In pale examples these spots are nearly obliterated. Wings whitish hyaline, nervures concolorous. Last ventral segment but little longer than the penultimate, hind margin but slightly produced medially, with a pair of short, rather distant teeth, including a shallow notch.

A single male from Maryland has the elytra fulvous brown with a slight vinous tinge and without hyaline spots, and the nervures of the wings brown, otherwise like the female.

Buffalo, N. Y.; Muskoka, Ont.; Quebec, Provancher; Maryland and Massachusetts, Uhler. There can, I think, be no doubt but that this is the insect described by Mr. Fitch as *Athysanus minor*, but I have not seen his types, if indeed they still exist, and his brief description will not admit of a positive identification. It is certainly very near *fenestratus*, of which it may be a pale variety.

8. **Bythoscopus nigrinasi** Fitch.

Athysanus nigrinasi Fitch, Homop. N. Y. State Cab. p. 61, 1851; J. B. Smith, List of Insects of N. J., p. 446, 1890.

Bythoscopus do., Walker, List of Homop. iv, p. 1162.

Color varying from pale yellowish cinereous to deep fuscous; legs yellow, front embrowned; elytra normally marked as in *fenestratus;* last ventral segment of the female bilobed on its apical margin. Length about 4 mm.

The color and the extent of the markings in this species is subject to great variation; ordinarily the front, inner margin of the cheeks, a part at least of the pectoral pieces, and a spot or ring near the apex of the femora are fuscous or black. Dark examples have the disc of the discal and anti-apical areoles, the base of the clavus and a spot before its apex whitish hyaline. In pale examples the elytra are subhyaline with two transverse fulvous or brown bands, more or less strongly indicated. Thus far the females. The males are of a uniform dark brown or fuscous shade, with the vertex, a transverse broad band on the front basally, and the the venter, soiled yellow; the legs pale yellow, and a space on the commissural nervure near its apex and sometimes another on its base whitish. In both sexes the face is less convex than in *fenestratus* and its allies and the vertex is consequently shorter; the pronotum is transversely rugosely punctured, the anterior margin slightly calloused and behind the eye obscurely pitted and the scutellum is frequently tinged with ferruginous. The last ventral segment of the female is rather short and bilobate, or waved on its hind margin.

This is our most abundant species in western New York. I have taken it in the vicinity of Buffalo, from June to August, and at "Rock City" near Salamanca, N. Y., Aug. 2, 1889, at an elevation of 1677 feet. Mr. Kilman has kindly sent me examples taken at Ridgeway, Ont., and I am indebted to Mr. W. J. Palmer, Jr., for several examples taken on Mt. Balsam, N. C. From Mr. Uhler I have received specimens labeled Grimsby (Ont. ?), Connecticut and Maryland, one of which is a typical example of *nigrinasi* received by Mr. Uhler direct from Dr. Fitch.

Although quite variable, this species can be readily distinguished by the form of the last ventral segment of the female, the blackish front, and usually by the markings on the elytra. It lives on the blue beech (*Carpinus americanus*).

◆

ABSCHIEDSWORTE.

With this notice, my editorial work on ENTOMOLOGICA AMERICANA ceases. The business affairs of the journal have been, and are such as to demand a constant personal attention, which I cannot give. I have therefore concluded to relieve myself of possible charges of neglect, and sometime since sent in my resignation to the Society in such terms as to leave them no alternative but acceptance.

It is with feelings of regret that I take leave of those to whom I have written so often, and I take this occasion to thank most heartily those who, by their aid and sympathy, have enabled me to attain such measure of success for the journal as has been its lot.

JOHN B. SMITH.

Preparatory stages of Schizura leptinoides Grote.

BY HARRISON G. DYAR.

Egg.—Of the shape of the upper two-thirds of a sphere, flat below; minutely punctured, shining, very pale greenish yellow. Diameter 1 mm. Laid singly on the under surface of the leaf. Duration of this stage, seven days.

First Larval Stage.—Head depressed at the vertex, pale greenish yellow, the lower third shaded with sordid brownish. Width .5 mm. The body is slightly elevated dorsally at joints 5 and 12 and bears small warts, one per segment, row one anteriorly in subdorsal space, two subdorsal (these rows taken on each side form the "trapezoidal spots"), three more rows laterally and one on the bases of the legs, all small and bearing a few hairs. The warts of row one on joint 2 are rather larger than the others. Color yellowish green, joints 5 and 12 and the subventral space, except on joints 6 and 13 crimson; feet black, except the anal pair, and these are elevated. Length, after hatching, 2.5 mm. Duration of this stage three days. The larvæ eat the parenchyma and not the whole leaf, until the second stage.

Second Larval Stage.—Head rather higher than wide, the lobes rounded, dark wine red, blackish on the flattened front. Width 8 mm. Body a little enlarged dorsally at joints 5 and 12, which, with the ventral and lateral regions, are dark brown. Dorsum brownish yellow, brighter on joints 3 and 4, and with a yellow patch of triangular shape on joints 10 and 11, ending abruptly on joint 11 posteriorly. Warts as before, small, with a few hairs. Length 5 mm. As the stage advances the whole body becomes dark reddish brown, finely mottled with yellow, especially so at the sides of joints 3 and 4 and dorsally on joints 6 and 7. On joint 10 is a small, bright yellow, oval patch, touching on joint 11 a larger, hemispherical, similarly colored spot, containing four partly confluent brown spots, its base toward the anal end, the contained spots in a transverse row of three, with the fourth in front. Duration of this stage four days.

Third Larval Stage.—Head pale brownish, mottled with brown; a broad dark vertical band extends from each side of the mouth to the vertex of the lobe, once dentate inwardly above the middle; triangular plate and labrum pale. Width 1.3 mm. A dorsal process on joint 5 surmounted by two tubercles and slighter processes resembling humps on joints 8, 9 and 12. Besides the dorsal tubercles that surmount the humps, there are two lateral and two subventral rows of smaller ones, while on joint 13 there are two tubercles in the dorsal rows. Body pale brown, heavily mottled with blackish brown, especially in a broad dorsal band on joints 2 and 4, and laterally on joints 5 and 10. On joints 3 and 4, laterally, is a subquadrate paler patch, yellowish above, and similar yellowish marks dorsally on joints 6 and 7. The yellow patch on joints 10 and 11 is as before. A whitish ventral band on the last segments. As the stage advances the lateral brown marks on joints 5–10 fade into the ground color, leaving a narrow, black, subdorsal line and all the yellow marks, except those on joints 10 and 11, disappear. Duration of this stage four days.

Fourth Larval Stage.—Head shaped as before, very pale brown, thickly and evenly mottled with little crinkled lines of dark brown; a few hairs. Width 2.1 mm. Dorsal process on joint 5 long, perpendicular in front, a little sloping behind, surmounted by two whitish tubercles each bearing a hair. On joint 8 is a slight elevation, on joint 9 a larger one, and a similar one on joint 12, a little larger than that on joint 8, each surmounted by two tubercles which, with those on the other segments, form row one of the first stage. The lateral ones are also present, small, whitish, each bearing a hair. Body pale brown, mottled with dark brown, evenly like the head, except that on joints 2 and 4 is a broad, dark brown dorsal band, while the sides of these joints are often paler; on joints 6 to 11 is a narrow subdorsal line, and on the dorsum of joints 6 to 8 are oblique brown lines, one on each segment, posteriorly to which the color is paler. The yellow patch on joints 10 and 11 (the usual V-mark) is triangular on joint 10, but on joint 11 is divided into three spots, the outer ones elongate, the posterior one small and rounded. Venter nearly black by the confluence of the mottlings; a broad, pale greenish, ventral band. Thoracic feet pale brownish testaceous; anal ones elevated when at rest. Duration of this stage four days.

Fifth Larval Stage.—Head higher than wide, slightly depressed at the vertex and marked as in the preceding stage. Maxillæ, bases of antennæ and ocelli, red-brown. Width 3.3 mm. The body for joints 2 to 4, 6, 11 and 13, is not as high as the vertex of the head; the dorsal process on joint 5 is long and large, its surmounting pair of tubercles pointing forward; joints 7 to 10 are arched and apparently enlarged dorsally by the abdominal feet being held close together, joints 8 and 9 each have a double hump, the one on joint 9 the larger, but both shorter than the process on joint 5; a slight double hump on joint 12, its apices closer together than those of the others. The surmounting tubercles are brown, tipped with white, each bearing a hair. These tubercles form part of row one and the rest, arranged as the warts in *Arachnis picta*,* are very small, whitish, and each bears a hair. The body is colored as in the previous stage, and is subject to considerable variation in the depth of coloration from very pale brown to almost black in different examples. The back of the head and a broad dorsal band on joints 2 to 4 are dark brown edged with whitish, and there is a narrow subdorsal line on joints 5 to 11 bordered below by a paler shade. The oblique dorsal lines on joints 6 to 8 are not distinct, but the pale shades bordering them are evident, and the angular mark on joints 10 and 11 has lost its bright yellow color and approaches very nearly these pale shades in appearance, or is slightly pinkish. Joints 12 and 13 are a little paler than the rest of the body and a pale shade passes up the back of the process on joint 5. There is a broad, pale whitish ventral band, with which the thoracic feet are concolorous; the abdominal feet are concolorous with the body, the anal ones but little used, and usually held against the leaf, or but little elevated. Spiracles pale brown, with a fine black border. A single dark colored larva out of the brood of thirty, from which this description is drawn, had a white spot above the spiracle on joint 11, and another smaller one before and below, in this character approaching the marking of *Ianassa lignicolor*. Length of larva about 30 mm. Duration of this, the last larval stage, six days.

COCOON.—Thin, rather tough, semi-transparent, parchment-like. It is spun between two leaves. The larvæ of the first brood pupate in a few days, but those of the second brood pass the Winter in the cocoon and pupate in the Spring. Only ten per cent. of my larvæ produced imago the same Summer.

PUPA.—Cylindrical, the abdominal segments gently tapering, capable of much motion. There is an elevation between the eyes bearing two small tubercles and a curved row of cubical granulations at the posterior edge of the thorax. Cremasters, two, parallel, separate, rather thick and bluntly spinose. Color shining dark red-brown. Wing cases creased and body punctured, but minutely.

FOOD-PLANT. — Hickory (*Carya*). Larvæ from Dutchess County, N. Y.

It will be observed that this larva differs from the larvæ of the other known species of *Schizura* in lacking the lateral green patch on the thoracic segments, and in the last stage the yellow dorsal V-shaped mark. In the last character it approaches the larva of

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* See ENTOMOLOGICA AMERICANA, vol. vi, p. 74.

I. lignicolor as well as in the curious occurrence of white spots at the spiracles of joint 11 as noted above. There does not seem to be any character to separate the larva of *I. lignicolor* generically from *Schizura.*

The larva of *S. leptinoides* is protected by its resemblance to a brown dead piece of Hickory leaf, and it has the habit of leaving pieces of leaf partly eaten off which soon wither and become brown, like the larva. It girdles the stem of the leaf that it is about to feed upon, causing it to bend down and be more easily reached. This habit is shared by *S. ipomeæ.*

NOTE ON LEPISMA DOMESTICA Pack.

By E. Bergroth, Forssa, Finland.

In his synopsis of the North American Thysanura, Prof. Packard has described, under the specific name of *domestica*, a remarkable new *Lepisma* living in the houses about hearths and fire-places at Salem, Mass. From Packard's description there can be no doubt that this species is congeneric with the European *Lepisma furnorum* Prov., upon which Grassi (Bull. Soc. Ent. Ital. xix, 1887) founded the subgenus *Thermophila*, elevated to the rank of a genus by Oudemans (Tijdschr. v. Entomologie xxxii, 1889), who published a more complete description and an excellent colored drawing of the insect. *Thermophila* seems to be well distinguished from *Lepisma*, especially by the six-jointed maxillary palpi, but the name being twice pre-occupied in entomology (Lepidoptera and Coleoptera) I propose to substitute that of *Thermobia.*

Thermobia furnorum was detected in the Lombardy by Rovelli in 1884, and has lately been found abundantly in the bake-houses at Amsterdam by Oudemans. It lives in similar situations as the American *Th. domestica*, which, judging from the description, is nearly allied to, but specifically distinct from the European species.

In accordance with custom, and for the last time in Entomologica Americana, ye editor wishes all our readers and friends a Happy New Year. J. B. S.

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